COMPACT DISC PLAYER

DP-MA5/MA9

SERVICE MANUAL

KENWOOD

© 1992-9 PRINTED IN JAPAN
B51-4588-00(O) 4344

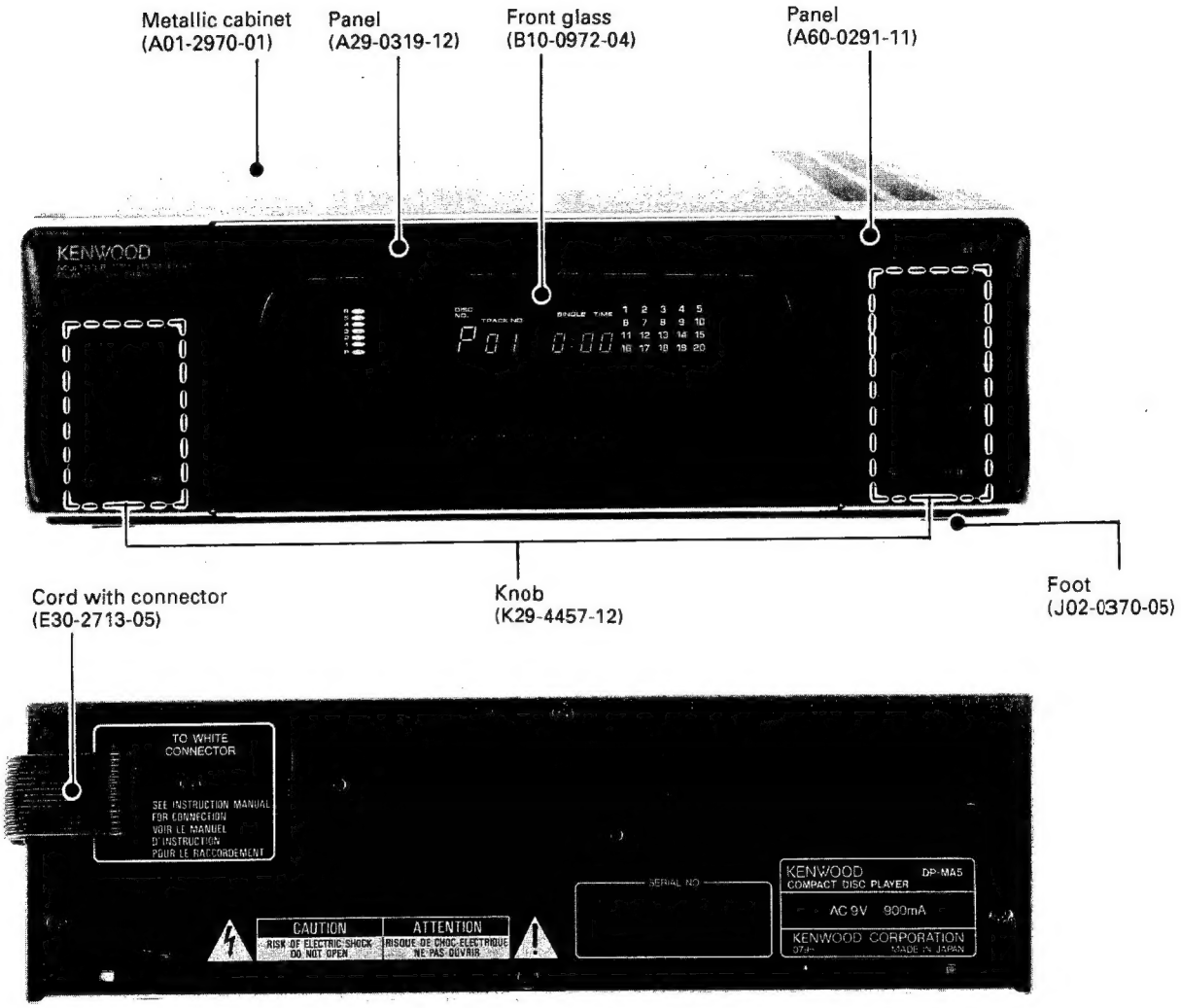


***Photo is DP-MA5.**

In compliance with Federal Regulations, following are reproductions of labels on, or inside the product relating to laser product safety.

KENWOOD-Corp. certifies this equipment conforms to DHHS Regulations No. 21 CFR 1040. 10, Chapter 1, Subchapter J.

DANGER : Laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE TO BEAM.

CAUTION : When doing repair of DP-MA5, MA9 be sure to have the customer bring the A-A5/L, A-A7/L, C-A9/L or use power supply jig RM-90PS, or supply to 9V AC to terminal Nos 12 and 13 of CN11 on the X32-2280 PC board ass'y. If not get 9V AC, please order the A-848's power transformer (parts No. L07-0038-05 / 120V / 220V / 240V). Refer to the DP-911 service manual. Don't use the "RHEOSTAT".

DP-MA5/MA9

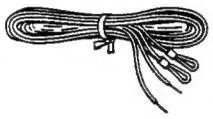
CONTENTS/ACCESSORIES

CONTENTS

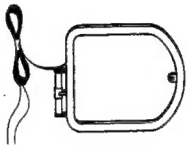
ACCESSORIES 2
EXTERNAL VIEW : DP-MA9 3
CONTROL 4
REMOTE CONTROL OPERATION 5
DISASSEMBLY FOR REPAIR 7
BLOCK DIAGRAM 9
CIRCUIT DESCRIPTION
1. TEST MODE 10
2. Microprocessor : μPD75217GF-616 (IC6) 12
3. RF Amplifier : CXA1571M (IC1) 14
4. Servo Signal Processor : CXA1372Q (IC2) ... 15
5. Digital Signal Processor : CXD2500AQ (IC3) 17
6. D/A Converter : TC9237BF (IC4) 20
ADJUSTMENT 22
REGLAGE 22
ABGLEICH 23
PC BOARD (COMPONENT SIDE VIEW) 25
SCHEMATIC DIAGRAM 27
EXPLODED VIEW (MECHANISM) 31
EXPLODED VIEW (UNIT) 33
PARTS LIST 35
SPECIFICATIONS ..... BACK COVER

ACCESSORIES

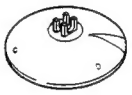
• FM indoor antenna 1
(T90-0176-05)



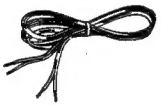
• AM loop antenna 1
(T90-0173-05)



• Loop antenna stand 1
(J19-2815-04)

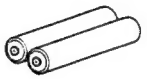


• Speaker cords* 2
*Refer to speaker's service manual.

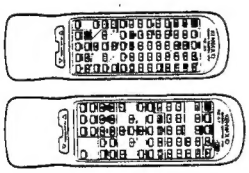


• Magazine (with 6 disc trays) 1
(J19-3394-13)

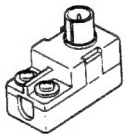
• Battery ("AAA" or "R03") 2
(–)



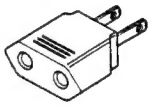
• Remote control unit 1
(X94-1000-71 : RC-A5) DP-MA5
(X94-1000-61 : RC-A7) DP-MA9



• Antenna adaptor (75Ω/300Ω) 1
(T90-0185-05) : For U.K. and Europe



• AC plug adapter (M type only) 1
(E03-0115-05 : Except for some areas)



For the unit with a European AC plug in areas other than Europe.

Speaker cords are packed with the speakers. Remote control unit is packed with the graphic equalizer unit. Magazine is packed with the CD player. All other accessories are packed with the receiver unit.

System name	Pre-amp	Main amp	Receiver	Graphic equalizer	CD player	Cassette deck	Speaker
UD-900M	C-A9/L	B-A9	–	–	DP-MA9	X-A9	LS-A9
UD-700M	–	–	A-A7/L	GE-A7	DP-MA9	X-A9	LS-A6
UD-500M	–	–	A-A5/L	GE-A5	DP-MA5	X-A5	LS-A5

System name	Outer packing case
UD-900M	H60-0108-04 : M, P, X
	H60-0109-04 : E
	H60-0110-04 : K
UD-500M	H60-0104-04 : P, M, X, Y
	H60-0105-04 : E

System name	Outer packing case
UD-500M	H60-0106-04 : K
UD-700M	H60-0101-04 : M, X, P
	H60-0102-04 : E
	H60-0100-04 : K

EXTERNAL VIEW : DP-MA9

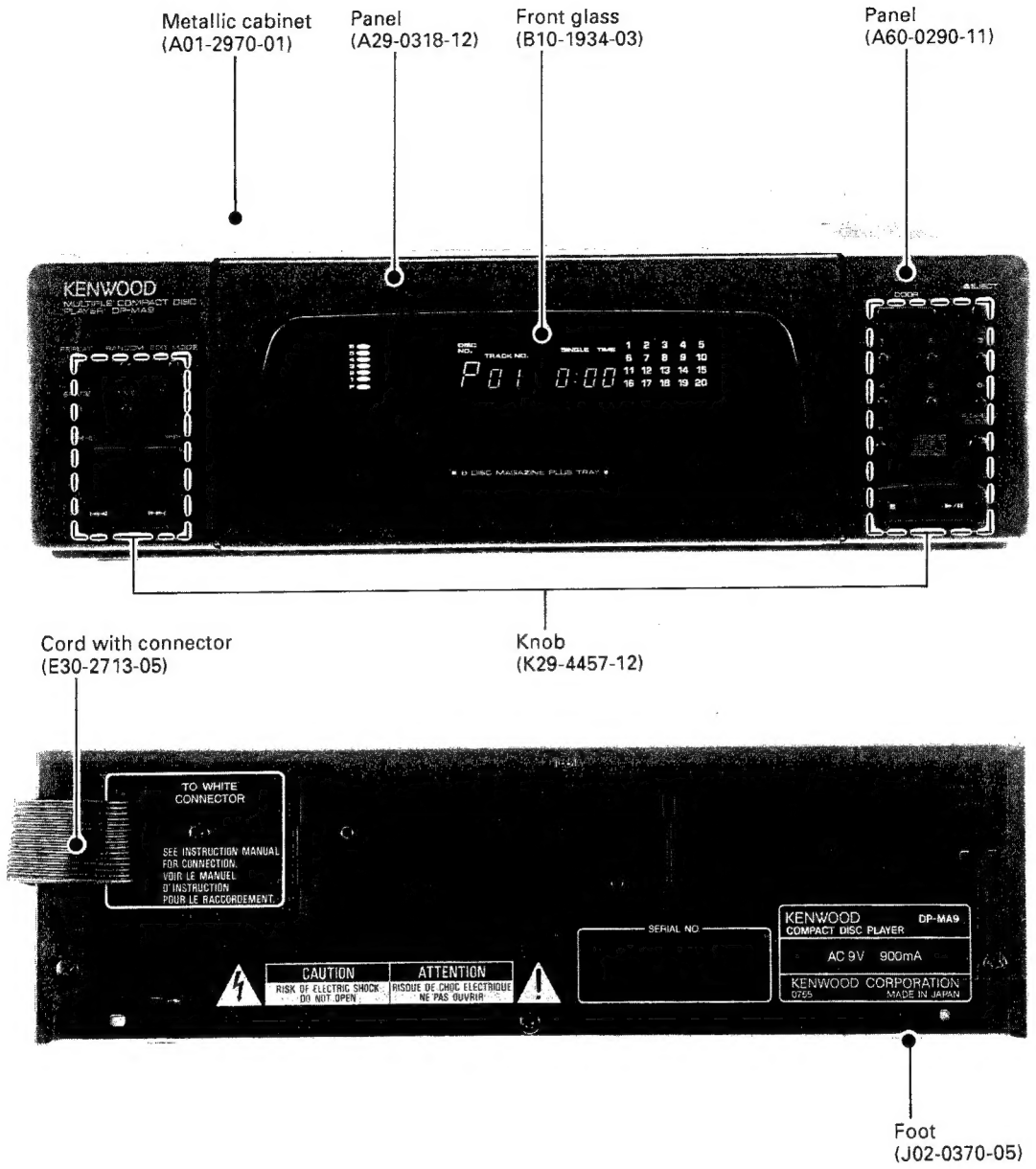
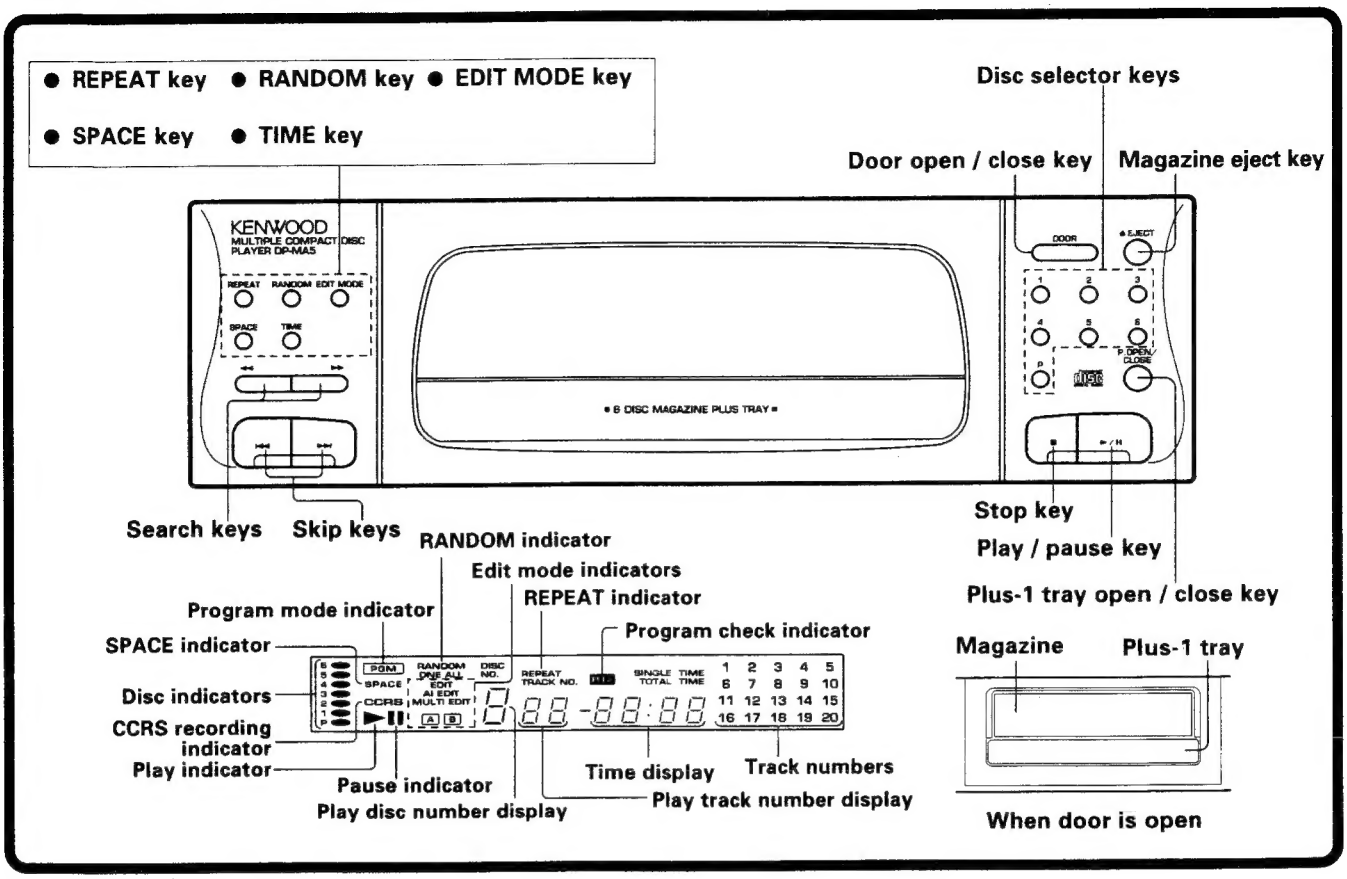


***Photo is DP-MA9.**

DP-MA5/MA9

CONTROL

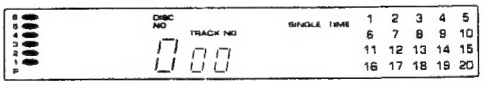


• Note related to transportation and movement (CD player)

Before transporting or moving this unit, carry out the following operations.

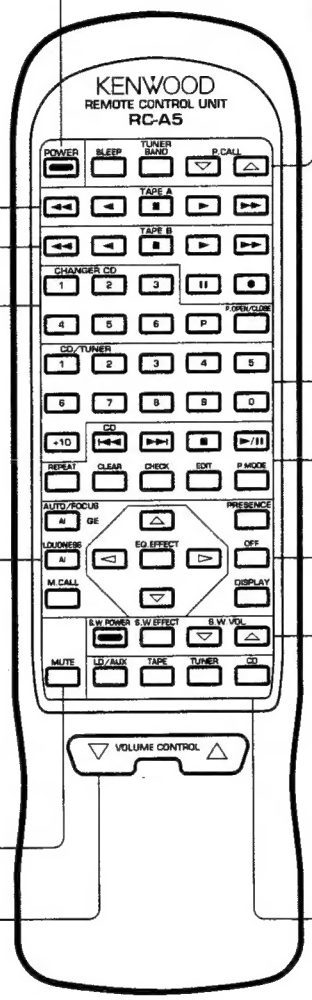
1. **Turn the power ON but do not load a disc.**
2. **Wait a few seconds and verify that the display shown appears.**
3. **Turn the power OFF.**
4. **Set the transportation hardware to the rear panel (exploded view No. 640).**

Without magazine, press the [►/II] key.



REMOTE CONTROL OPERATION

Model : RC-A5 (DP-MA5)



POWER key

TUNER operation keys
SLEEP key, BAND key, P.CALL keys (△, ▽)

Numeric keys
When the CD input is selected, these keys can be used as the numeric keys of the CD player.
When the TUNER input is selected, these keys can be used as the numeric keys of the tuner.

TAPE A operation keys

TAPE B operation keys

CD CHANGER operation keys (DP-MA5 only)
P.OPEN / CLOSE key,
Disc selector keys (1 ~ 6, P)

CD player operation keys
⏮, ⏭ keys, ■ key, ▶/⏸ key,
REPEAT key, CLEAR key, CHECK key,
EDIT key, P.MODE key

Equalizer operation keys
AI AUTO / AI FOCUS key, AI LOUDNESS key,
M.CALL key,
DISPLAY key, EQ.EFFECT keys (△ ▽ ◁ ▷)

Presence control keys
PRESENCE key, Presence OFF key.

SUPER WOOFER operation keys
S.W.POWER key, S.W.EFFECT key,
S.W.VOL keys.

MUTE key

VOLUME CONTROL keys
Press to increase or decrease the sound volume. When the keys are operated, the indicator on the VOLUME CONTROL knob of the main unit turns while blinking at a high speed.

Input selector keys

DP-MA5/MA9

REMOTE CONTROL OPERATION

Model : RC-A7 (DP-MA9)

SUPER WOOFER operation keys
To operate the super woofer speaker, set the A / B switch to the A position.
S.W.POWER key, S.W.EFFECT key, S.W.VOL keys.

POWER key

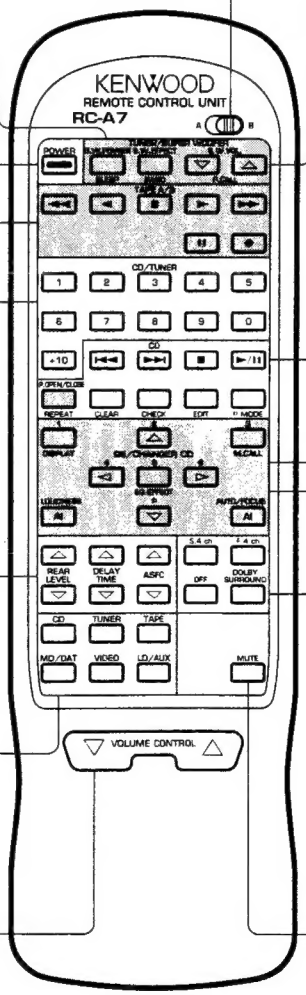
Cassette deck operation keys
To operate deck A, set the A / B switch to the A position. (The ● and ▮▮ keys are invalid in this position.)
To operate deck B, set the A / B switch to the B position.

Numeric keys
When the CD input is selected, these keys can be used as the numeric keys of the CD player.
When the TUNER input is selected, these keys can be used as the numeric keys of the tuner.

Presence control keys
ASFC keys, REAR LEVEL keys, DELAY TIME keys.

Input select keys

VOLUME CONTROL keys
Press to increase or decrease the sound volume. When the keys are operated, the indicator on the VOLUME CONTROL knob of the main unit turns while blinking at a high speed.



Remote control function A / B selector switch
The keys in the sections marked with ▒▒ can be used in two ways according to the position of this switch.
- When the function of a key is described in white and brown characters, the brown function is usable in the A position and the white function is usable in the B position.
- Other keys are usable regardless of the A or B position of this switch.

TUNER operation keys
To operate the tuner, set the A / B switch to the B position.
SLEEP key, BAND key, P.CALL key.

CD player operation keys
⏮ ⏭ keys, ■ key, ▶/▮▮ key, CLEAR key, CHECK key, EDIT key, P.MODE key.
When A / B switch is in the A position:
P.OPEN / CLOSE key (for CD player equipped with CD disc changer).
When A / B switch is in the B position:
REPEAT key

CD changer (DP-MA9) operation keys
To operate the changer-equipped CD player, set the A / B switch to the A position.

Equalizer operation keys
To operate the equalizer, set the A / B switch to the B position.
AI AUTO / AI FOCUS key, AI LOUDNESS key, M.CALL (Memory Call) key, DISPLAY key, EQ.EFFECT keys (▽, △, ▷, ◁)

Presence effect keys
S.4ch key, F.4ch key,
DOLBY SURROUND key, Presence OFF key.

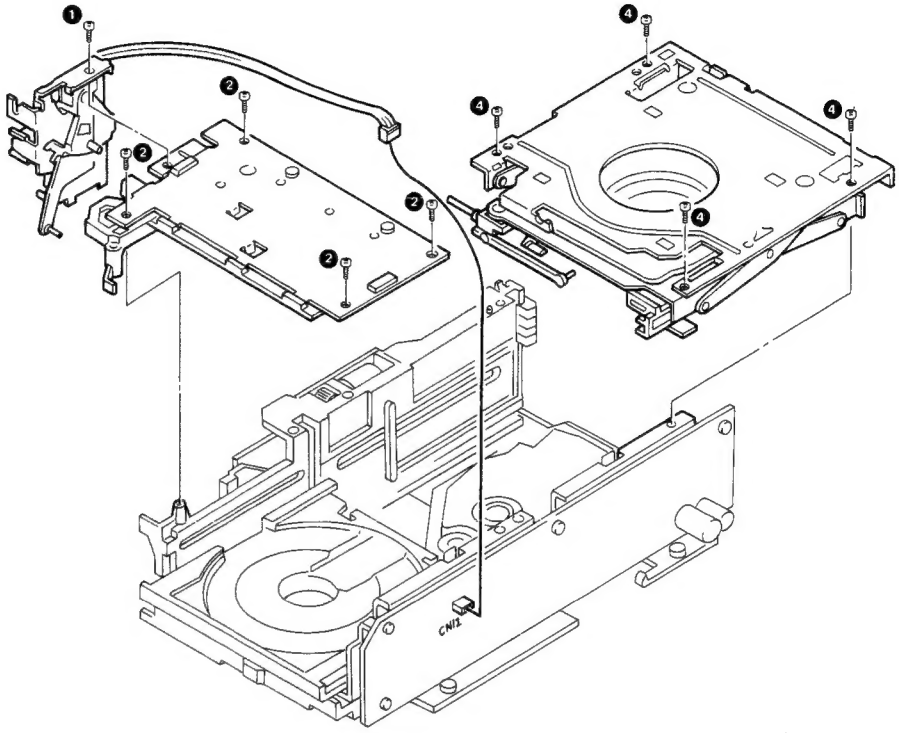
MUTE key

DISASSEMBLY FOR REPAIR

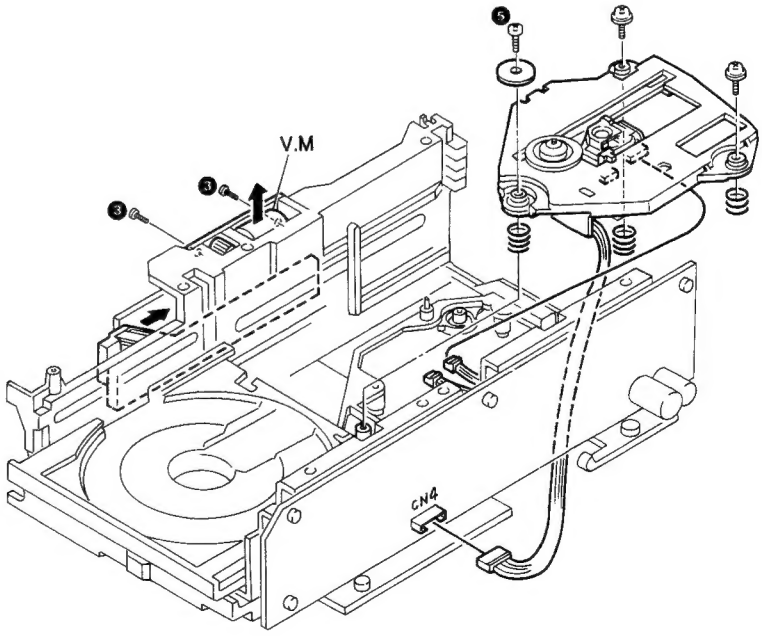
1. How to Disassemble MD (Mechanism Deck) ass'y

*** Take out Magazine pack.**

1. Remove solenoid ass'y (❶).
2. Remove magazine lock ass'y (❷).



3. Remove screws of vertical motor (❸).
4. Lift up motor and move slider fully backwards.
5. Remount vertical motor with screws.
6. Remove lifter ass'y (❹).
7. Remove screws of MD ass'y (❺).

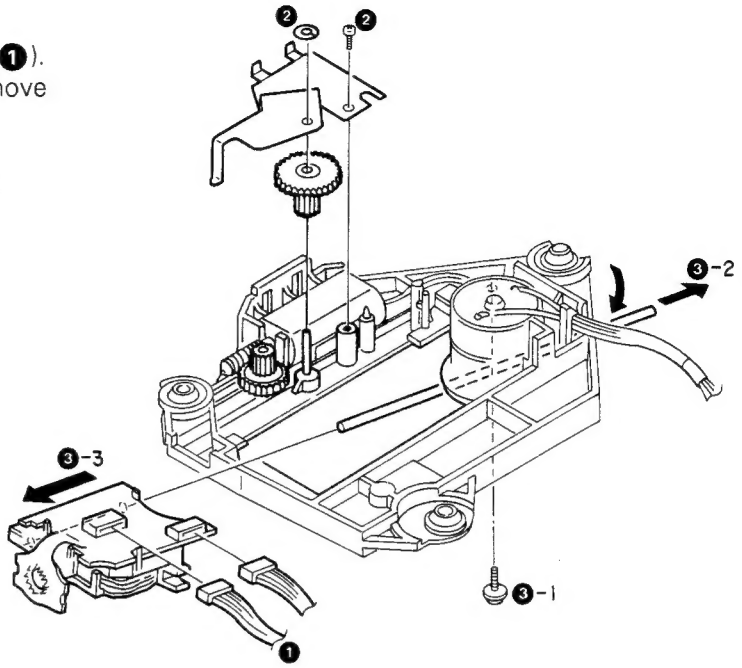


DP-MA5/MA9

DISASSEMBLY FOR REPAIR

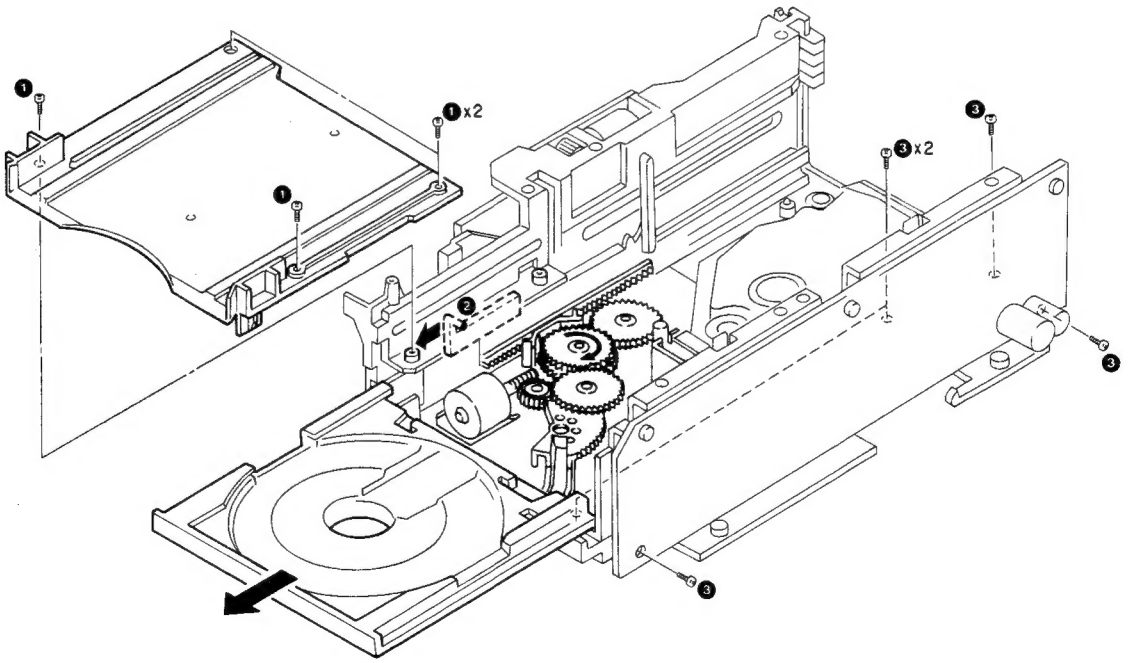
2. How to Replace the Pickup

1. Remove MD ass'y and connector for pickup (❶).
2. Remove washer and screw (❷). And remove feed gear.
3. Remove screw for pickup rod (❸ -1).
4. Pull out rod (❸ -2) and remove pickup (❸ -3).

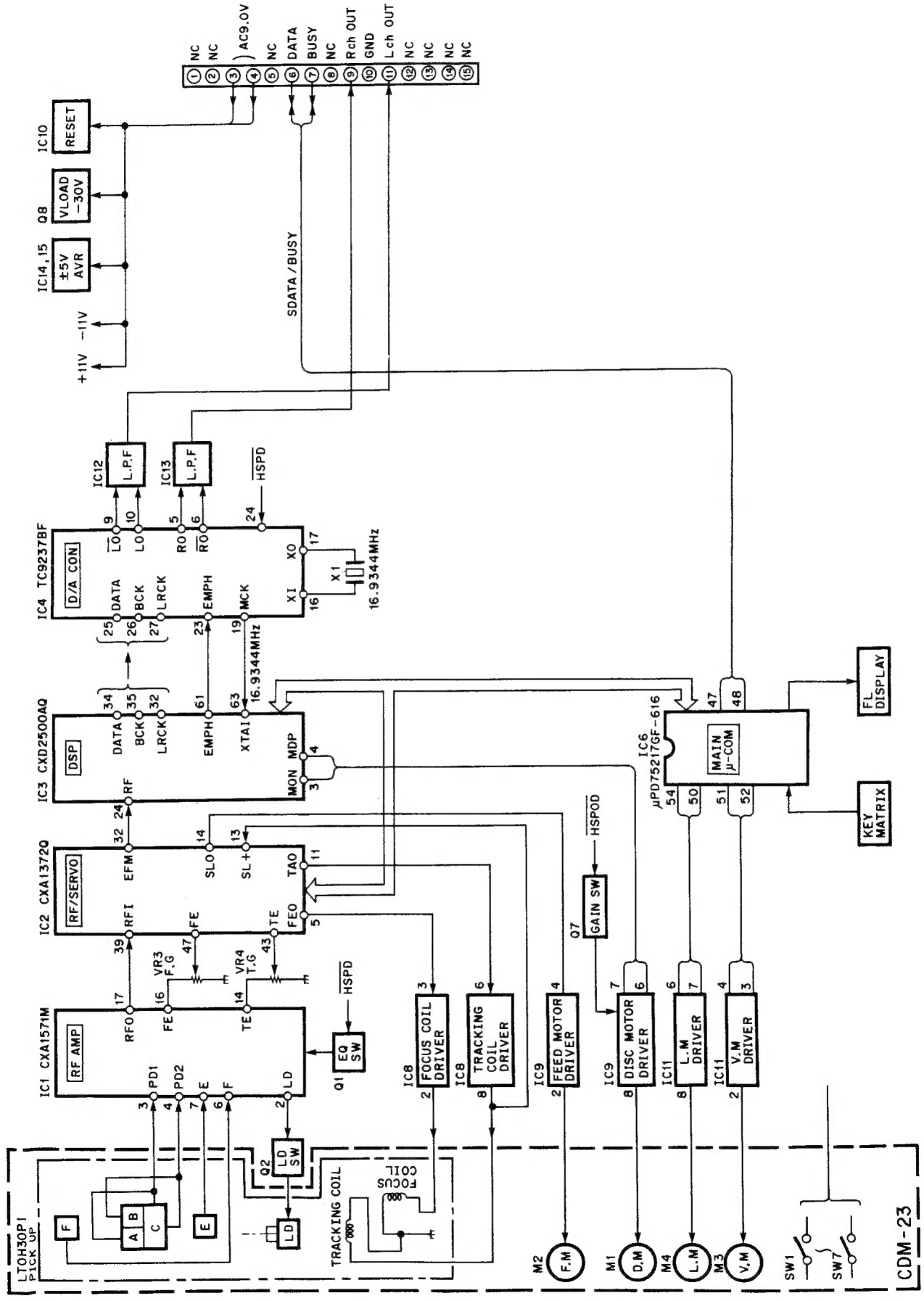


3. How to Remove Plus 1 Tray ass'y

1. Unscrew screws (❶) and remove magazine pack holder.
2. Move lock lever (❷) frontwards and pull out plus 1 tray frontwards. If not come out tray, turn gear clockwise.
3. Remove screws (❸).



BLOCK DIAGRAM



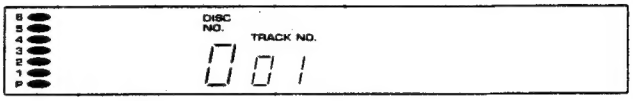
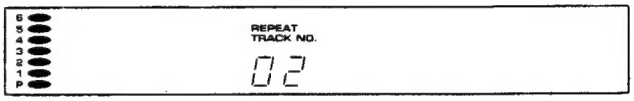
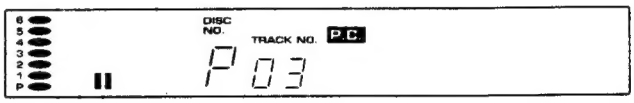
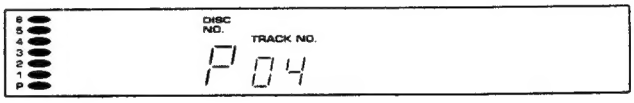
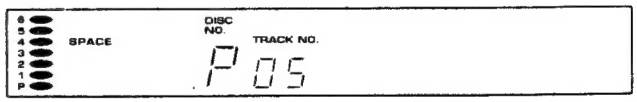
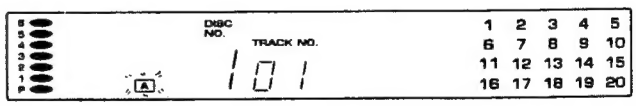
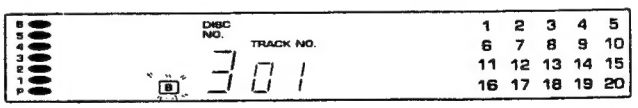
DP-MA5/MA9

CIRCUIT DESCRIPTION

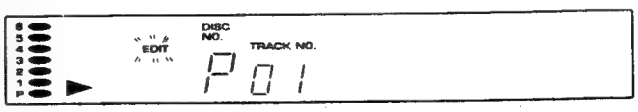
1. Test Mode

1-1. Setting the test mode

This microprocessor built in this unit (X32-) can be put to TEST MODE by just short-circuiting the test pins (#2 and #3).

No.	Input key	Function	Display
1	STOP	(1) Focusing servo ..... OFF (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	
2	REPEAT	(1) Laser (In STOP mode only) ..... ON	
3	RANDOM	(1) Focusing servo ..... ON (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	
4	TIME	(1) Focusing servo ..... ON (2) Tracking servo ..... ON (3) Feed servo ..... OFF	
5	PLAY	(1) Focusing servo ..... ON (2) Tracking servo ..... ON (3) Feed servo ..... ON	
6	DISC 1	Load No.1 disc to No.6 in order.	
7	DISC 2	Read the TOC (table of contents) of disc No.3 to No.6 in order. TEST mode is cancelled after reading the TOC of No.6 disc, and then playback the 1st track.	

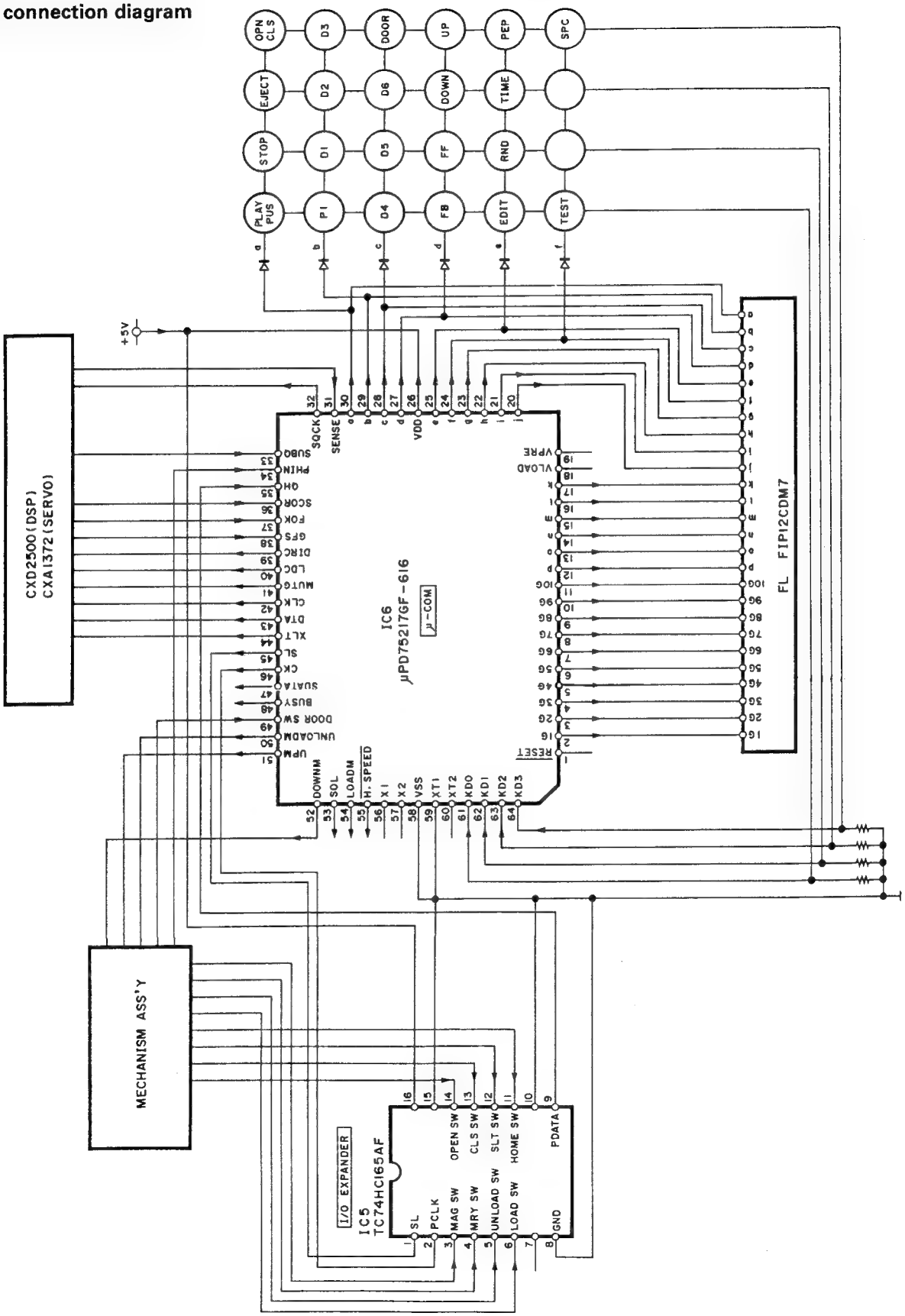
CIRCUIT DESCRIPTION

No.	Input key	Function	Display
8	DISC P	Load the decided No. disc which is pressed by the key and set to STOP mode. ex. Disc No.4 key is pressed (PLAY, CHECK and CLEAR keys are available to operat).	
9	UP	Turns all FL display lamps ON.	
10	DOWN	Turns all FL display lamps OFF. "DISC" and "1 ~ 6" are not off because circuit is static operation.	
11	EDIT	(1) Door opens. (2) P1 tray come out. Press "EDIT" key, "PLAY MODE".	
12	FF	In the STOP mode, moves the pickup slightly toward the outer position of disc.	
13	FB	In the STOP mode, moves the pickup slightly toward the inner position of disc.	
14	SPACE	High-speed playback CHECK mode (in stop mode only) playback P1 disc in high-speed mode. If press "SPACE" key, change to normal mode. In this mode, all keys are available.	

CIRCUIT DESCRIPTION

2. Microprocessor : μPD75217GF-616 (IC6)

2-1. Pin connection diagram



CIRCUIT DESCRIPTION

2-3. Pin functions : μPD75217GF-616

Pin No.	Pin name	I/O	Function
1	$\overline{\text{RESET}}$	–	Reset input port
2~11	1G~10G	O	FL segment control port
12~17	p~k	O	FL segment control port (key-scan)
18	VLOAD	O	FL driver negative power supply
19	VPRE	O	FL pre-driver power supply
20~25	j~e	O	FL segment control port also used for key-scan
26	VDD	–	Power supply (+5V)
27~30	d~a	O	FL segment control port also used for key-scan
31	SENSE	I	Signal detection port for SENSE signal from signal processor and servo IC
32	SQCK	O	Q-data read clock output port
33	SUBQ	I	Q-data input port
34	PHIN	I	Photo interrupter input port for mechanism
35	QH	I	Data input from TC74H165
36	SCOR	I	Sub-code frame sync detection signal input port
37	FOK	I	Input port of FOK signal from RF amp
38	GFS	I	Input port of frame sync signal
39	DIRC	O	DIRC control port of servo IC
40	LDC	O	Laser ON/OFF signal output
41	MUTG	O	Mute port of signal processor
42	CLK	O	Signal processor and servo IC control out port (CLOCK)
43	DATA	O	Signal processor and servo IC control out port (DATA)
44	XLT	O	Signal processor and servo IC control out port (LATCH)
45	S/L	O	Latch output port of TC74HC165
46	CK	O	Clock output port of TC74HC165
47	SDATA	I/O	Serial DATA I/O port
48	BUSY	I/O	Serial BUSY I/O port
49	DOORSW	I	Door switch input port of mechanism
50	UNLOADM	O	Control port of unloading motor for mechanism
51	UPM	O	Control port of UP motor for mechanism
52	DOWNM	O	Control port of DOWN motor for mechanism
53	SOL	O	Control port of solenoid for mechanism
54	LOADM	O	Control port of loading motor for mechanism
55	H.SPEED	O	High-speed control port (Active L)
56	X1	–	Oscillation input port (4.19MHz)
57	X2	–	Not used
58	Vss	–	GND
59	XT1	–	GND
60	XT2	–	GND
61~64	KD0~3	I	Key input port

2-3. I/O Expander : TC74HC165AF (IC5)

Pin functions

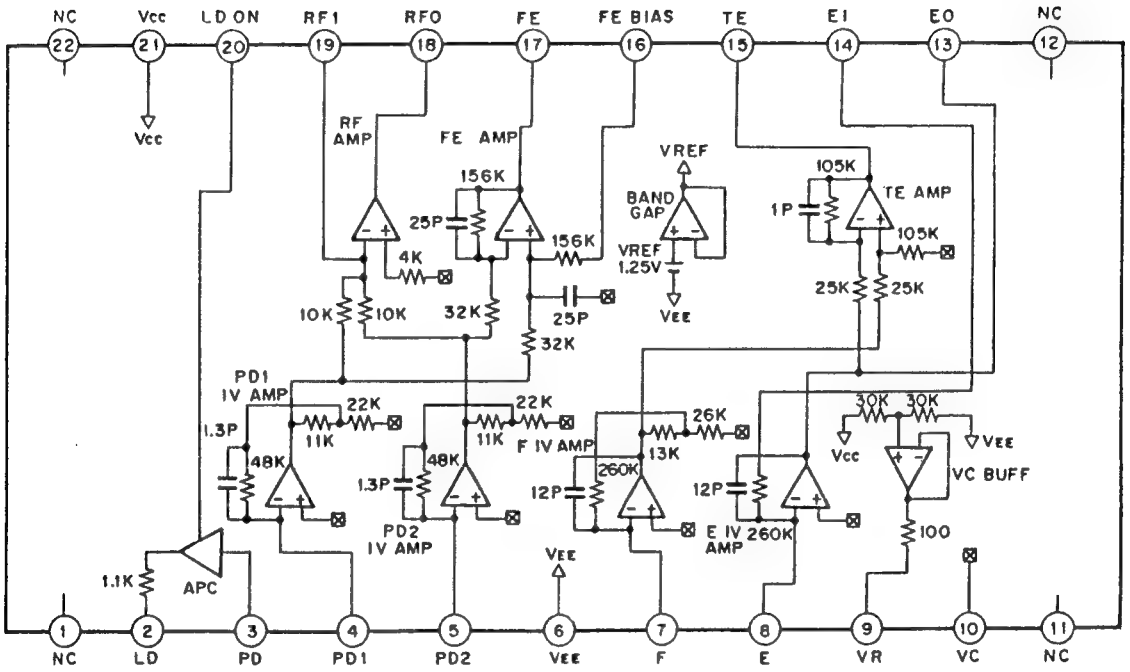
Pin No.	Pin name	I/O	Function
1	SL	I	Shift load input
2	PCLK	I	Clock input
3	MAGSW	I	Magazine switch (S4)
4	MRYSW	I	Memory switch (S3)
5	UNLOADSW	I	Unload switch (S2)
6	LOADSW	I	Load switch
7	–	O	No use
8	GND	–	Ground
9	PDATA	O	Data output
10	–	I	No use
11	HOMESW	I	Home position switch (S1)
12	SLTSW	I	Start limit switch (S8)
13	CLSSW	I	Tray close switch (S6)
14	OPNSW	I	Tray open switch (S7)
15	–	I	No use
16	Vcc	–	Power supply (+5V)

CIRCUIT DESCRIPTION

3. RF amplifier : CXA1571M (IC1)

CXA1571M is an IC developed for compact disc players. It contains an RF amplifier for 3 spot optical pickup, focus error amplifier, tracking error amplifier, and APC circuit.

3-1. Block diagram



3-2. Pin functions

Pin No.	Pin name	I/O	Function
2	LD	O	APC LD amplifier output pin.
3	PD	I	APC LD amplifier input pin.
4	PD1	I	RF I-V amplifier inverted input pin. Current input by connecting to the photo diode A+C terminals.
5	PD1	I	RF I-V amplifier inverted input pin. Current input by connecting to the photo diode B+D terminals.
7	F	I	F I-V amplifier inverted input pin. Current input by connecting to the photo diode F terminal.
8	E	I	E I-V amplifier inverted input pin. Current input by connecting to the photo diode E terminal.
9	VR	O	CD voltage output pin of (Vcc+Vee) / 2.
10	VC	I	Connected GND when using dual power supply (±).
			Connected to VR (pin 9) when using a single power supply.
13	EO	O	E output of I-V amplifier.
14	EI	–	E I-V amplifier feedback input pin. For E I-V amplifier gain adjustment.
15	TE	O	Tracking error amplifier output pin.
16	FE-BIAS	I	Bias pin on the focus error amplifier non-inverted side.
17	FE	O	Focus error amplifier output pin.
18	RFO	O	RF summing amplifier output pin.
19	RFI	I	Inverted input pin of RF amplifier. Gain of amplifier is fixed by resistor between RFO and RFI.
20	LD-ON	I	LD ON / OFF select pin. (Vcc : ON)

CIRCUIT DESCRIPTION

4. Servo Signal Processor : CXA1372Q (IC2)

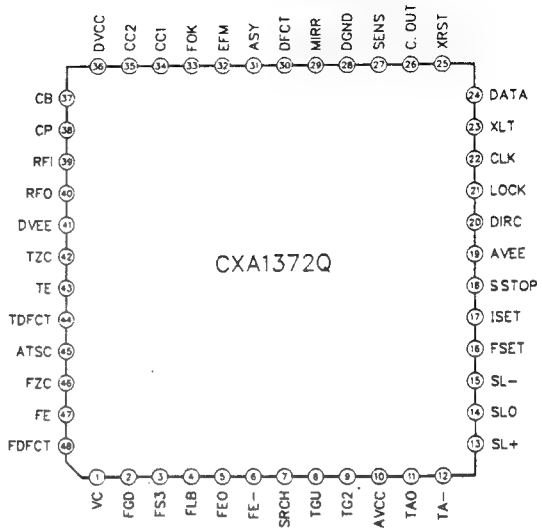
Outline

CXA1372Q is a bipolar IC developed to be used for processing of the RF signal (Focus OK, mirror, defect, comparator of EFM) and servo control.

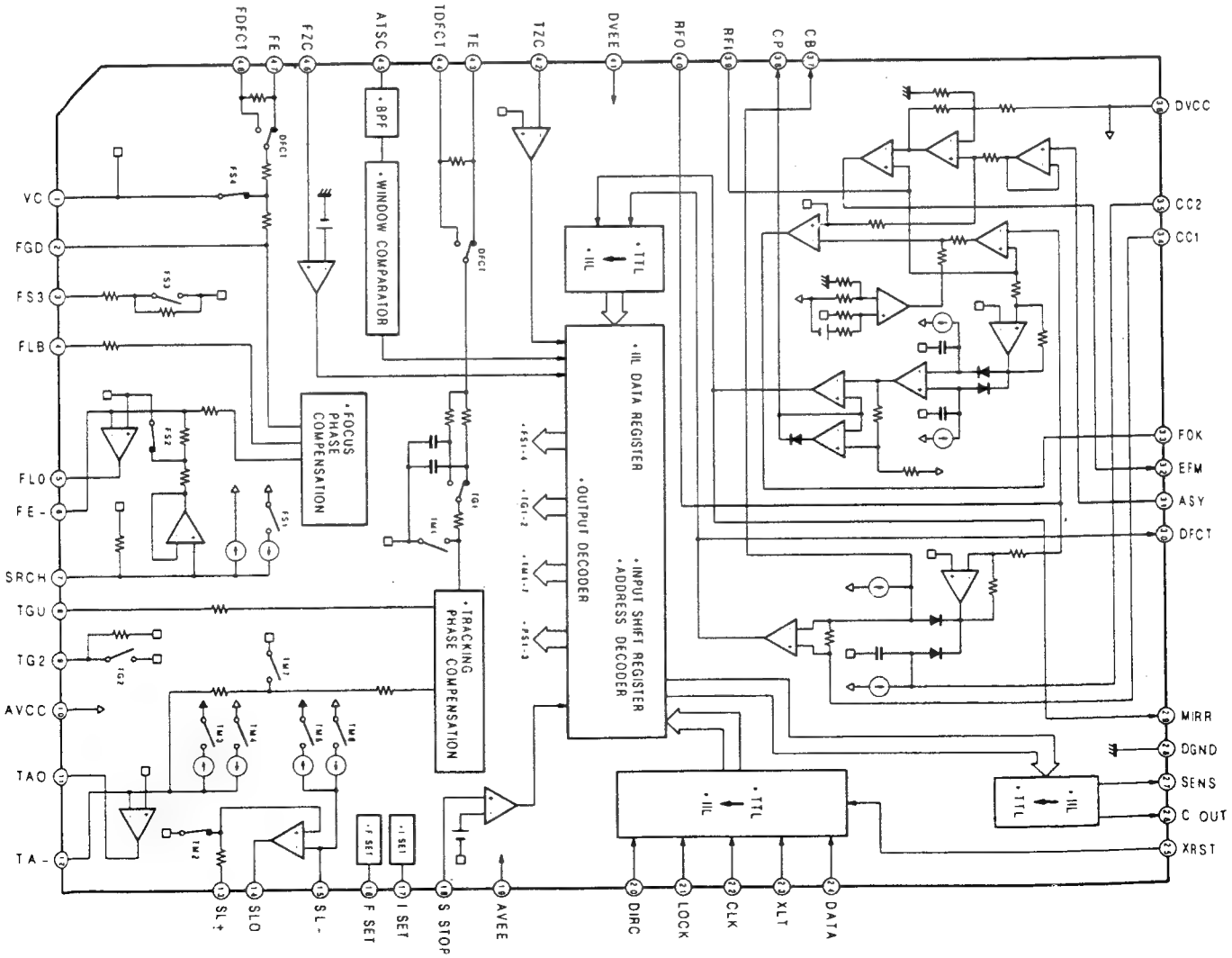
Functions

- Auto asymmetry control
- Focus OK detection circuit
- Mirror detection circuit
- Defect detection and countermeasure circuit
- EFM comparator
- Focus servo control
- Tracking servo control
- Thread servo control

4-1. Pin connection



4-2. Block diagram



CIRCUIT DESCRIPTION

4-3. Pin functions

Pin No.	Pin name	I/O	Function
1	VC	I	Middle-point voltage input terminal. When two power sources are used : GND, when single power source is used : (Vcc+GND)/2.
2	FGD	I	When lowering the high-band gain of the focus servo, insert a capacitor between this terminal and terminal No. 3.
3	FS3	I	Change the high-band gain of the focus servo by turning FS3 on and off.
4	FLB	I	Outside terminal of time constant for raising the low-band of the focus servo.
5	FEO	O	Focus drive output.
6	FE–	I	Inverted input terminal of focus amplifier.
7	SRCH	I	Outside terminal of time constant for making focus search waveform.
8	TGU	I	Outside terminal of time constant for changing high-band gain of tracking.
9	TG2	I	Outside terminal of time constant for changing high-band gain of tracking.
10	AVCC		
11	TAO	O	Tracking drive output.
12	TA–	I	Inverted input terminal of tracking amplifier.
13	SL+	I	Non-inverted input terminal of thread amplifier.
14	SLO	O	Thread drive output.
15	SL–	I	Inverted input terminal of thread amplifier.
16	FSET	I	Terminal for setting the peak for phase compensation of focus tracking.
17	ISET	I	Current for determining the height of the focus search track jump thread kick is applied.
18	SSTOP	I	Terminal for ON/OFF detecting signal of limit switch for detecting the most inside line of disc.
19	AVEE		
20	DIRC	I	Used to jump over one track. 47kΩ pull-up resistor is inserted.
21	LOCK	I	When "L", thread runaway-preventive circuit operates. 47kΩ pull-up resistor is inserted.
22	CLK	I	Clock input for transferring the serial data from CPU (having no pull-up resistors).
23	XLT	I	Latch input from CPU (having no pull-up resistors).
24	DATA	I	Serial data input from CPU (having no pull-up resistors).
25	XRST	I	Reset when reset input terminal is at "L" (having no pull-up reisitors).
26	SENS	O	Outputs FZC, AS, TZC, SSTOP, etc. on receipt of command from CPU.
27	C. OUT	O	Signal output for counting tracks.
28	DGND		
29	MIRR	O	Output terminal of MIRR comparator. (DC voltage : Load of 10kΩ connected)
30	DFCT	O	Output terminal of DEFECT comperator. (DC voltage : Load 10kΩ connected)
31	ASY	I	Input terminal of auto asymmetry control.
32	EFM	O	Output terminal of EFM comparator. (DC voltage : Load of 10kΩ connected)
33	FOK	O	Output terminal of focus OK comparator. (DC voltage : Load of 10kΩ connected)
34	CC1	I	DEFECT bottom hold output terminal.
35	CC2	O	Terminal in which DEFECT bottom hold output is input after capacitive coupling.
36	DVCC		
37	CB	I	Terminal to which DEFECT bottom hold capacitor is connected.
38	CP	I	Terminal for connecting MIRR hold comparator. Non-inverted input terminal of MIRR comparator.
39	RFI	I	Terminal in which output of RF summing amplifier is input after capacitive coupling.
40	RFO	O	Output terminal of RF summing amplifier. Check point of eye pattern.
41	DVEE		
42	TZC	I	Input terminal of tracking zero cross comparator.
43	TE	I	Input terminal of tracking error.
44	TDFCT	I	Terminal for connecting the capacitor for time constant in case of defect.
45	ATSC	I	Input terminal of window comparator for detecting ATSC.
46	FZC	I	Terminal for inputting the focus zero cross comparator.
47	FE	I	Input terminal of focus error.
48	FDFCT	I	Terminal for connecting capacitor for time constant in case of defect.

CIRCUIT DESCRIPTION

5. Digital Signal Processor : CXD2500AQ (IC3)

Outline

The CXD2500AQ is a digital signal processing LSI for a compact disc player, which has the following functions.

- A wide frame jitter margin realized by 32-KRAM (±28 frames)
- Bit clocks for strobing EFM signal are generated by the digital PLL, and the capture range is ±150kHz minumum
- Demodulation of EFM data
- Protection and reinforcement of EFM frame sync signal
- Strong error correction by refined super strategy. C1 : Double correction, C2 : Quadruple correction
- Double-speed replay and variable pitch replay
- Reduction of noise generation at track jumps
- Auto zero cross muting
- Demodulation of sub-code and detection of errors in sub-code Q data
- Digital spindle servo (Having over-sampling filter)
- 16-bit traverse counter
- CPU interface by serial bus
- A built-in servo auto sequencer
- Output for digital audio interface
- Built-in digital level meter and peak meter
- Applicable to bilingual system

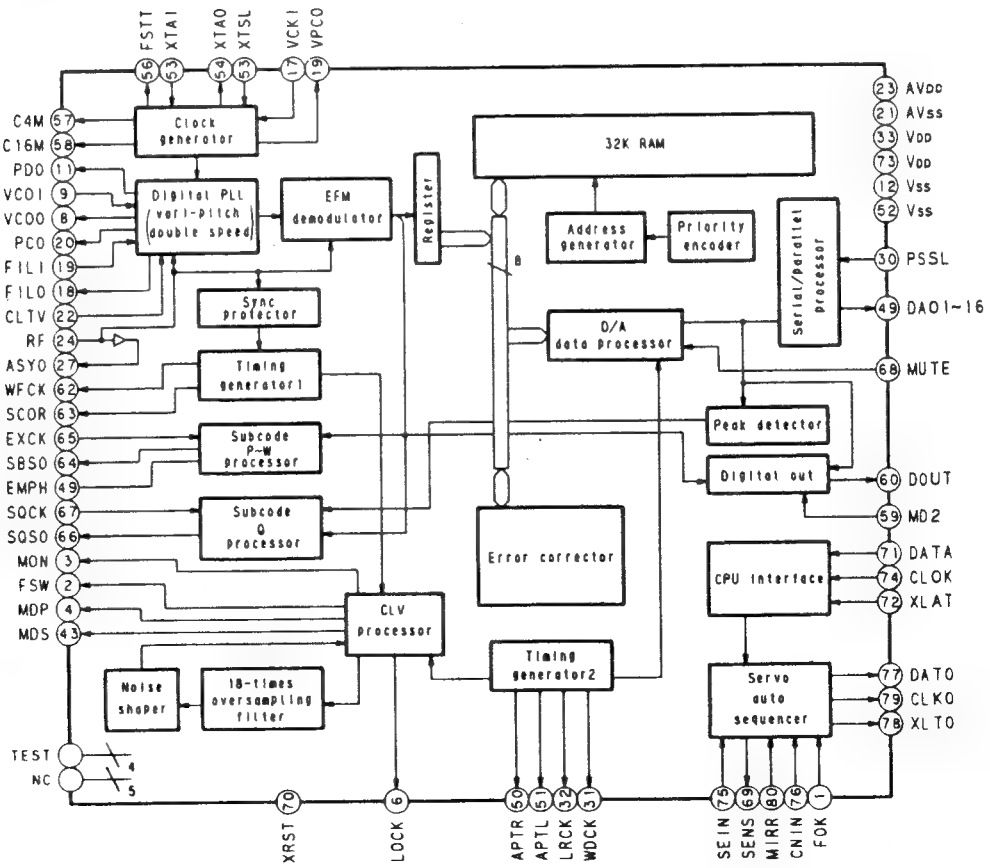
Features

- One chip of this LSI can process all the digital signals used for replay
- Integration level can be heightened because of the built-in RAM

Structure

Silicon gate CMOS

5-1. Block diagram



CIRCUIT DESCRIPTION

5-2. Pin functions

Pin No.	Pin name	I/O	Function
1	FOK	I	Focus OK input terminal. Used for SENS output and servo auto sequencer.
2	FSW	O	Output for changing output filter of spindle motor.
3	MON	O	ON/OFF control output of spindle motor.
4	MDP	O	Servo control of spindle motor.
5	MDS	O	Servo control of spindle motor.
6	LOCK	O	Outputs "H", when GFS is sampled at 460Hz and it is "H". Output "L", if "L" is detected eight times continuously.
7	NC	–	Not used.
8	VCOO	O	Oscillation circuit output for analog EFM PLL.
9	VCOI	I	Oscillation circuit input for analog EFM PLL. f_{LOCK} = 8.6436MHz
10	TEST	I	Test terminal, normally grounded.
11	PDO	O	Charge pump output for analog EFM PLL.
12	Vss	–	GND.
13~15	NC	–	Not used.
16	VPCO	O	PLL charge pump output for variable pitch.
17	VCKI	I	Clock input $f_{Ccenter}$ = 16.9344MHz from outside VCO for variable pitch.
18	FILO	O	Filter output for master PLL (Slave = Digital PLL).
19	FILI	I	Filter input for master PLL.
20	PCO	O	Charge pump output for master PLL.
21	AVss	–	Analog GND.
22	CLTV	I	VCO control voltage input for master.
23	AVDD	–	Analog power source (+5V).
24	RF	I	EFM signal input.
25	TEST2	I	Used for grounding.
26	TEST3	I	Used for grounding.
27	ASYO	O	EFM full swing output ("L" = Vss, "H" = VDD).
28	TEST4	I	Used for grounding.
29	NC	–	Not used.
30	PSSL	I	Audio data output mode changing input. Set to "L" for serial output and "H" for parallel output.
31	WDCK	O	D/A interface for 48-bit slot. Word clock f = 2 Fs
32	LRCK	O	D/A interface for 48-bit slot. LR clock f = Fs
33	VDD	–	Source voltage (+5V).
34	DA16	O	Outputs DA16 (MSB) when PSSL = 1. Outputs serial data of 48-bit slot when PSSL = 0. (2s' COMP, MSB first)
35	DA15	O	Outputs DA15 when PSSL = 1. Outputs bit clock of 48-bit slot when PSSL = 0.
36	DA14	O	Outputs DA14 when PSSL = 1. Outputs serial data of 64-bit slot when PSSL = 0. (2s' COMP, LSB first)
37	DA13	O	Outputs DA13 when PSSL = 1. Outputs bit clock of 64-bit slot when PSSL = 0.
38	DA12	O	Outputs DA12 when PSSL = 1. Outputs LR clock of 64-bit slot when PSSL = 0.
39	DA11	O	Outputs DA11 when PSSL = 1. Outputs GTOP when PSSL = 0.
40	DA10	O	Outputs DA10 when PSSL = 1. Outputs XUGF when PSSL = 0.
41	DA09	O	Outputs DA09 when PSSL = 1. Outputs XPLCK when PSSL = 0.
42	DA08	O	Outputs DA08 when PSSL = 1. Outputs GFS when PSSL = 0.
43	DA07	O	Outputs DA07 when PSSL = 1. Outputs RFCK when PSSL = 0.
44	DA06	O	Outputs DA06 when PSSL = 1. Outputs C2P0 when PSSL = 0.
45	DA05	O	Outputs DA05 when PSSL = 1. Outputs XRAOF when PSSL = 0.
46	DA04	O	Outputs DA04 when PSSL = 1. Outputs MNT3 when PSSL = 0.
47	DA03	O	Outputs DA03 when PSSL = 1. Outputs MNT2 when PSSL = 0.
48	DA02	O	Outputs DA02 when PSSL = 1. Outputs MNT1 when PSSL = 0.
49	DA01	O	Outputs DA01 when PSSL = 1. Outputs MNT0 when PSSL = 0.

CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Function
50	APTR	O	Control output for correcting aperture. Set to "H" when Rch.
51	APTL	O	Control output for correcting aperture. Set to "H" when Lch.
52	Vss	–	GND.
53	XTAI	I	X'tal oscillation circuit input of 16.9344MHz, or input of 33.8688MHz.
54	XTAO	O	X'tal oscillation circuit output of 16.9344MHz.
55	XTSL	I	X'tal selection input terminal. Set to "L" when x'tal is 16.9344MHz, and to "H" when 33.8688MHz.
56	FSTT	O	2/3 division output of terminals 53 and 54. Does not vary as pitch varies.
57	C4M	O	4.2336MHz output. Varies as pitch varies.
58	C16M	O	16.9344MHz output. Varies as pitch varies.
59	MD2	I	Digital-out ON/OFF control. Turns on when "H", and off when "L".
60	DOUT	O	Digital-out output terminal.
61	EMPH	O	Outputs "H" when playing disc has emphasis, and "L" when the latter does not.
62	WFCK	O	WFCK (Write Frame Clock) output.
63	SCOR	O	Outputs "H" when sub-code sync S0 or S1 is detected.
64	SBSO	O	Serial output of Sub P ~ W.
65	EXCK	I	Clock input for SBSO read out.
66	SQSO	O	Sub Q 80-bit and PCM peak, and level data 16-bit output.
67	SQCK	I	Clock input for SQSO read out.
68	MUTE	I	Mutes when "H", and resets when "L".
69	SENS	–	Outputs SENS to CPU.
70	XRST	I	Resets system when "L".
71	DATA	I	Inputs serial data from CPU.
72	XLAT	I	Latches serial data when latch input from CPU falls.
73	VDD	–	Power supply (+5V).
74	CLOK	I	Serial data transfer clock input from CPU.
75	SEIN	I	Input SENS from SSP.
76	CNIN	I	Inputs signals for counting number of track jumps.
77	DATO	O	Outputs serial data to SSP.
78	XLTO	O	Outputs serial data latch to SSP, and latches at fall.
79	CLKO	O	Outputs serial data transfer clock to SSP.
80	MIRR	I	Inputs mirror signal. Auto sequencer uses this for jumping 128 or more tracks.

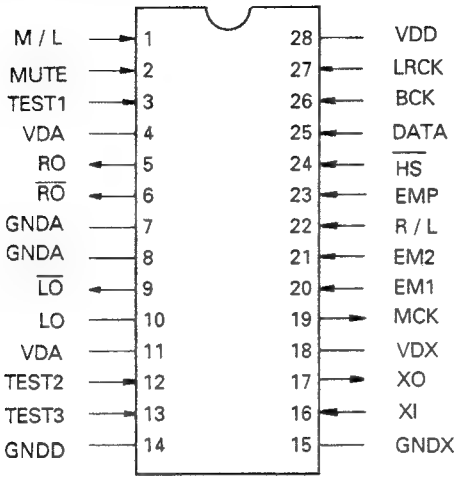
Notes

- The 64-bit slot is 2's compliment output of LSB first, and the 48-bit slot is 2's compliment output of MSB first.
- GTOP is used to monitor the protective condition of the frame sync. ("H" : Sync protective window is released.)
- XUGF is the frame sync obtained from the EFM signal, which is a negative pulse. This is the signal before the protection of sync.
- XPLCK is the inverted clock of EFM PLL. PLL is so made that the falling edge will be matched to the change point of the EFM signal.
- The GFS becomes "H" when the frame sync is matched to the internal protection timing.
- RFCK is a signal having the period of 136μ obtained by the accuracy of X'tal.
- C2P0 is a signal indicating the error condition of data.
- XRAOF is a signal generated when 32 KRAM exceeds the jitter margin of ±28F.

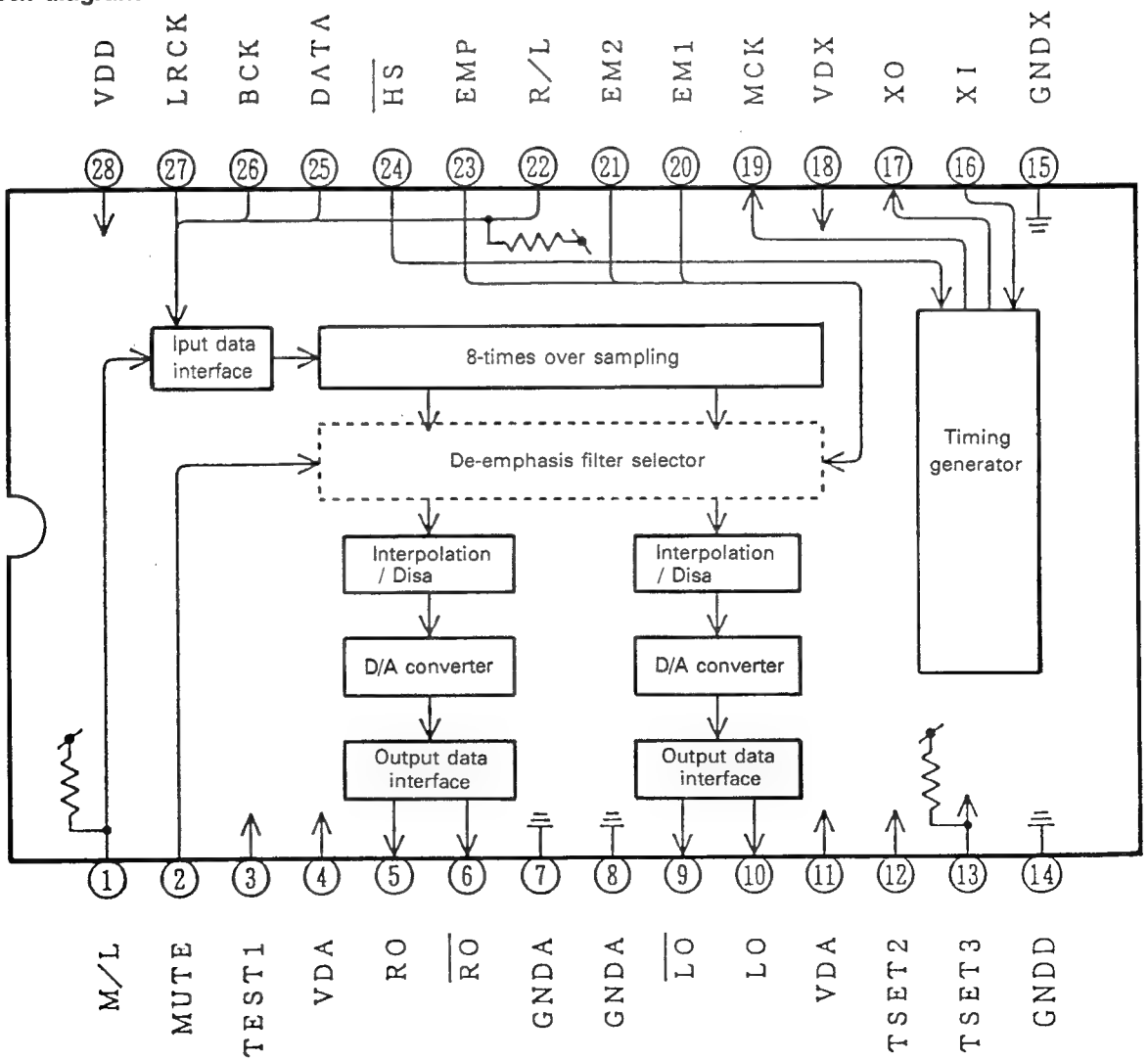
CIRCUIT DESCRIPTION

6. D/A converter : TC9237BF (IC4)

6-1. Terminal connection diagram



6-2. Block diagram



CIRCUIT DESCRIPTION

6-3. Pin functions

Pin No.	Pin name	I/O	Function
1	M/L	I	Selection of MSB first or LSB first. H = MSB, L = LSB.
2	MUTE	I	Muting control. H = Mute ON
3	TEST1	I	Test terminal (connect to H level).
4	VDA	–	Power supply for analog circuit (R-ch).
5	RO	O	R-ch data output.
6	$\overline{RO}$	O	Inverted R-ch output.
7	GNDA	–	Ground for analog circuit (R-ch).
8	GNDA	–	Ground for analog circuit (L-ch).
9	$\overline{LO}$	O	Inverted L-ch data output.
10	LO	O	L-ch data output.
11	VDA	–	Power supply for analog circuit (L-ch).
12	TEST2	I	Test terminal (connect to L level).
13	TEST3	I	Test terminal (connect to H level or open circuit).
14	GND	–	Ground for logic.
15	GNDX	–	Ground for oscillation.
16	XI	I	Generation of clock freq (384fs).
17	XO	O	Generation of clock freq (384fs).
18	VDX	–	Power supply for oscillation.
19	MCK	O	Clock output of system (384fs).
20, 21	EM1, 2	I	De-emphasis filter selector.
22	R / L	I	R / L-ch data selector.
23	EMP	I	De-emphasis filter ON / OFF selector (H = ON, L = OFF).
24	HS	I	Normal or Double speed selector (H = Normal, L = Double).
25	DATA	I	Data input.
26	BCK	I	Bit clock input.
27	LRCK	I	LR clock input.
28	V_{DD}	–	Power supply for logic.

EM1	L	L	H	H	
EM2	L	H	H	L	
Mode	44.1kHz	32kHz	48kHz		

R / L	LRCK	
	LOW	HIGH
LOW	R-ch data	L-ch data.
HIGH	L-ch data	R-ch data.

DP-MA5/MA9

ADJUSTMENT/REGLAGE

No.	ITEM	INPUT SETTING	OUTPUT SETTING	PLAYER SETTING	ALIGNMENT POINT	ALIGN FOR	FIG.
1	TRACKING ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (CN3-1) CH2: TE (CN3-6)	Press the P. OPEN/CLOSE key to open the tray. Reset to TEST mode. Then, press the CHECK key. Confirm that the display is "03".	TE BALANCE VR2	Symmetry between upper and lower patterns, or DC=0±0.05V	(a)
2	FOCUS ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (CN3-1) CH2: TE (CN3-6)	Press the PLAY key. Confirm that the display is "05".	FE BALANCE VR1	Optimum eyepattern Grating is correctly a ligned with the RF level of 1.5Vp-p or more and the TE (servo open) level of 1.5Vp-p or more, the pickup is acceptable.	(b)
3	FOCUS GAIN	Test disc Type 4 Apply signal of 1kHz, 0.1Vrms to CN3 pin 2 and 3.	Connect a LPF to CN3 pin 2-3, to which connect an oscilloscope or two AC voltmeters.	Press the PLAY key. Confirm that the display is "05".	FOCUS GAIN VR3	Two VTVMs should read the same value.	(c)
4	TRACKING GAIN	Test disc Type 4 Apply signal of 1.3kHz, 0.1Vrms to CN3 pin 5 and 6.	Connect a LPF to CN3 pin 5-6, to which connect an oscilloscope or two AC voltmeters. or two AC voltmeters.	Press the PLAY key. Confirm that the display is "05".	TRACKING GAIN VR4	Two VTVMs should read the same value.	(c)

(NOTE) Type 4 disc : SONY YEDS-18 TEST DISC or equivalent. LPF: around 47kohms+390pF or so. Adjustment procedures are in TEST MODE.

N°	ARTICLE	ENTREE	SORTIE	MISE EN FONCTIONNEMENT DU LECTEUR	POINT DE CONTROLE	CRITERE D'APPRECIATION	FIG.
1	BALANCE D'ERREUR D'ALIGNEMENT	Disque d'essai de type 4	Brancher un oscilloscope comme suit. CH1 : RF (CN3-1) CH2 : TE (CN3-6)	Appuyer sur la touche P.OPEN/CLOSE pour ouvrir le plateau, puis revenir au mode TEST. Appuyer ensuite sur la touche CHECK et vérifier que l'écran affiche "03".	VR2 POUR BALANCE D'ERREUR D'ALIGNEMENT	Symétrie entre les portions supérieure et inférieure de l'onde, ou 0 ±0,05V CC	(a)
2	BALANCE D'ERREUR DE FOCALISATION	Disque d'essai de type 4	Brancher un oscilloscope comme suit. CH1 : RF (CN3-1) CH2 : TE (CN3-6)	Appuyer sur la touche PLAY. S'assurer que l'écran affiche "05".	VR1 POUR BALANCE D'ERREUR DE FOCALISATION	Trame optimale Lorsque le réseau de diffraction est correctement aligné et que le niveau de haute fréquence est égal à 1,0 Vc-c ou plus et le niveau d'erreur d'alignement (avec le servomécanisme au repos), à 1,5 Vc-c ou plus, la tête de lecture est considérée comme étant normale	(b)
3	GAIN DE FOCALISATION	Disque d'essai de type 4 Appliquer un signal de 1,0kHz, 0,1Veff. sur les broches 2 et 3 du CN3.	Brancher un filtre passe-bas aux broches 2-3 du CN3 et y connecter un oscilloscope ou deux voltmètres à CA.	Appuyer sur la touche "PLAY". S'assurer que l'écran affiche "05".	GAIN DE FOCALISATION VR3	Deux voltmètres doivent indiquer la même valeur.	(c)
4	GAIN D'ALIGNEMENT	Disque d'essai de type 4 Appliquer un signal de 1,3kHz, 0,1Veff. aux broches 5 et 6 du CN3.	Brancher un filtre passe-bas aux broches 5-6 du CN3 et y connecter un oscilloscope ou deux voltrmètres à CA.	Appuyer sur la touche "PLAY". S'assurer que l'écran affiche "05".	GAIN D'ALIGNEMENT VR4	Deux voltmètres doivent indiquer la même valeur.	(c)

(NOTE)Disque de type 4 : DISQUE D'ESSAI SONY YEDS-18 ou équivalent. Filtre passe-bas : autour de 47kohms+390pF environ
La procédure de réglage est en mode TEST.

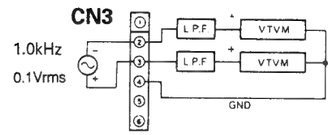
ABGLEICH

Nr.	Gegenstand	Eingang	Ausgang	Player	Abgleich	Abgleichen für	Abb
1	TRACKING-FEHLER BALANCE	Test-CD Typ 4.	Ein oszilloskop folgendermaßen anschließen: CH1 : RF (CN3-1) CH2 : TE (CN-3-6)	Zum öffnen der Lade die Taste P.OPEN/CLOSE drücken und das Gerät auf TEST-Betrieb schalten. Danach die CHECK-Taste drücken. Sicherstellen, daß auf der Anzeige "03" erscheint.	TRACKING-FEHLER BALANCE VR2	Auf Symmetrie zwischen oberem und unterem Muster bzw. eine Gleichspannung von 0±0,05V einstellen.	(a)
2	FOKUS-FEHLER BALANCE	Test-CD Typ 4.	Ein oszilloskop folgendermaßen anschließen: CH1 : RF (CN3-1) CH2 : TRACKING-FEHLER (CN-3-6)	Die PLAY-Taste drücken und sicherstellen, daß auf der Anzeige "05" erscheint.	FOKUS-FEHLER BALANCE VR1	Optimales Augenmuster. Der Abtaster ist zufriedenstellend bei korrekter Fluchtung der Rastereinteilung mit einem RF-Pegel von mindestens 1,5 Vss und einem TRACKING-FEHLER-Pegel (Servo unterbrochen) von mindestens 1,5 Vss.	(b)
2	FOKUS-VERSTÄRKUNG	Test-Disc Typ 4. Den Kontakten 2 und 3 von CN3 ein Signal von 1,0kHz, 0,1Veff zuleiten.	Ein Tiefpaßfilter an die Kontakte 2 und 3 von CN3 anschließen, und ein Oszilloskop oder zwei Wechselstrom-Voltmeter anschließen.	Die PLAY-Taste drücken. Sicherstellen, daß im Display "05" angezeigt wird.	FOCUS GAIN VR3 (Potentiometer)	Zwei VTVM müssen den gleichen Wert zeigen.	(c)
3	SPURHALTE VERSTÄRKUNG	Test-Disc Typ 4. Den Kontakten 5 und 6 von CN3 ein Signal von 1,3kHz, 0,1Veff zuleiten.	Ein Tiefpaßfilter an die Kontakte 5 und 6 von CN3 anschließen, und ein Oszilloskop oder zwei Wechselstrom-Voltmeter anschließen.	Die PLAY-Taste drücken. Sicherstellen, daß im Display "05" angezeigt wird.	TRACKING GAIN VR4 (Potentiometer)	Zwei VTVM müssen den gleichen Wert zeigen.	(c)

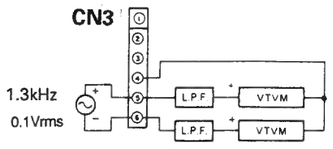
(Zur Beachtung) Test-Disc Typ 4 : Sony YEDS-18 Test-Disc oder gleichwertig. Tiefpaßfilter : ca. 47kOhm+390pF.
Einstellverfahren im prüfbetrieb (TEST MODE).

(c)Focus Gain and Tracking Gain Adj.

Focus gain adj.



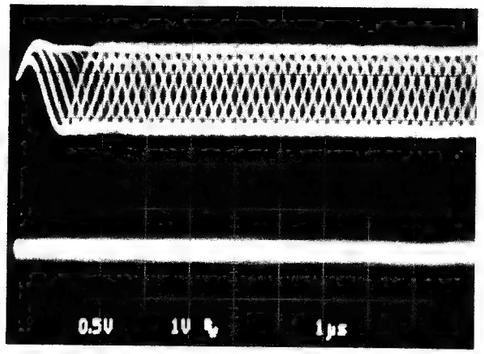
Tracking gain adj.



DP-MA5/MA9

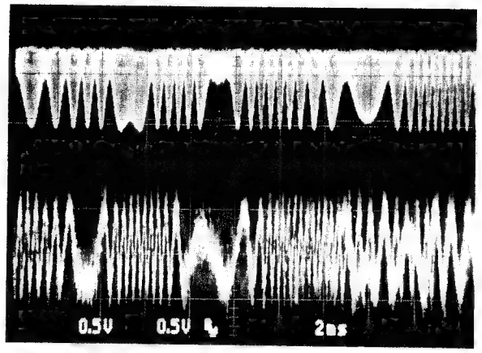
ADJUSTMENT

RF level Wave-form



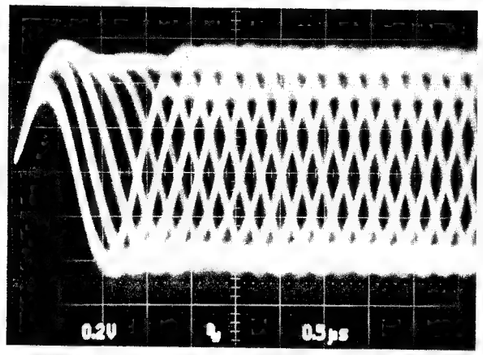
- RF signal and E.Spot signal in test mode (PLAY).

Tracking error balance



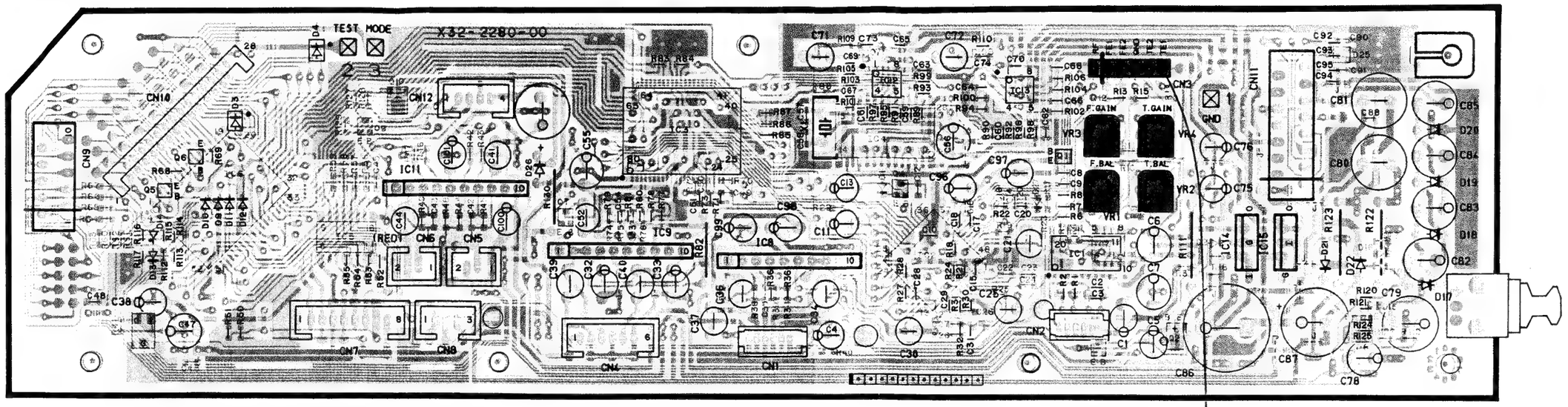
- RF signal and T.Error signal; in test mode (Focusing ON). (Disc type 4)
- Adjust T.Error so that the waveform is symmetrical above and below 0V (VR2).

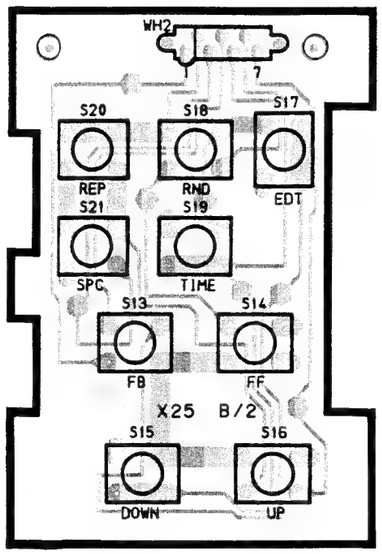
Focus error balance

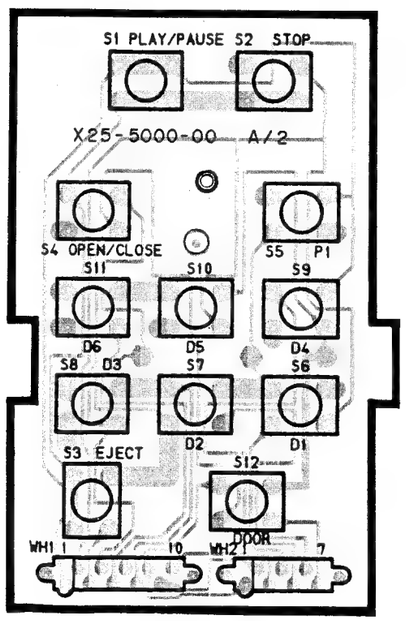


- RF signal in test mode (PLAY).
- Perform the tangential and focusing offset adjustments so that each of the center cross points are focused into one point on the display. The crossing points above and below the center shall also be displayed clearly.

PC BOARD (COMPONENT SIDE VIEW)

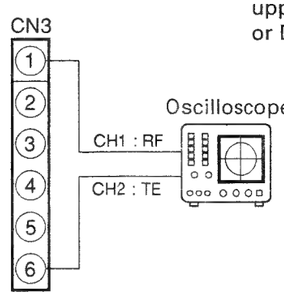




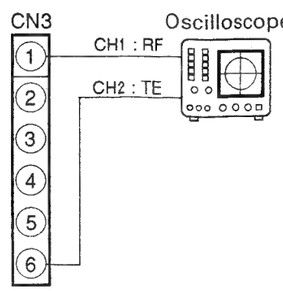


Refer to the schematic diagram for the values of resistors and capacitors.

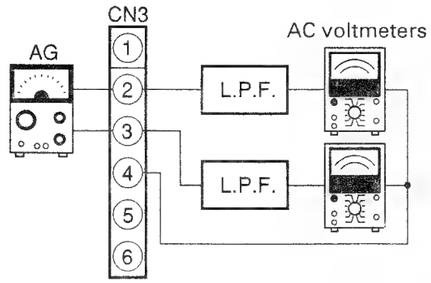
(a) Tracking error balance : Symmetry between upper and lower or DC = 0 ± 0.05V



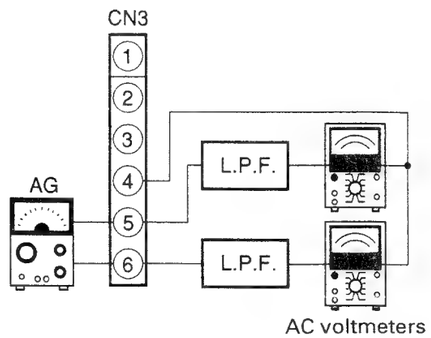
(b) Focus error balance : Optimum eye pattern



(c) Focus gain : Two VTVMs should read the same value.



(c) Tracking gain : Two VTVMs should read the same value.



MECHANISM ASS'Y (CDM-23)

(X32-2280-00)

ACTUATOR

HOLOGRAM LASER UNIT LTOH30PI

CNP1

CNP2

DISC MOTOR

FEED MOTOR

PU LIMIT SW

LOADING MOTOR

VERTICAL MOTOR

MAGAZINE IN SW

MEMORY SW

LOADING IN/OUT SW

HOME POSITION SW

LIFT POSITION SENSOR

J70-0251-02

DOOR SW

DOOR SOLENOID

PI OPEN /CLOSE SW

WH3

WH4

WH5

WH6

CN1

CN2

CN3

CN4

CN5

CN6

CN7

CN8

RF AMP

FE BUFF

EQ SW NORMAL/HIGH

FOCUS COIL DRIVER

TRACKING COIL DRIVER

TE-BAL

FE-OF

F-GAIN

T-GAIN

LDP

FEED MOTOR DRIVER

LOADING MOTOR DRIVER

VERTICAL MOTOR DRIVER

D/A CONVERTER

DEFECT SW

IC2 (Bottom View) EFM COMPARATOR SERVO IC

IC3 (Top View) DIGITAL SIGNAL PROCESSOR

GAIN SW NORMAL/HIGH

DISC MOTOR DRIVER

RESET

+5V AVR

-5V AVR

-30V AVR

2SC3246

DTA124EU
DTC124EU
2SC4081

2SB1308

2SD1963

HN2D01F

LA6510
TA8410AK

NJM4565M

TC74HC165AF

LM2940CT-5.0

CXA1571M

CXD2500AQ

CXA1372Q

(X25-5000-00)(A/2)

(X25-(B/2)

IC1	:CXA1571M
IC2	:CXA1372Q
IC3	:CXD2500AQ
IC4	:TC9237BF
IC5	:TC74HC165AF
IC6	:μPD75217GF-616
IC7,12,13	:NJM4565M
IC8,9,11	:TA8410AK or LA6510
IC10	:PST529DMT or PST572DMT
IC14	:LM2940CT-5.0
IC15	:μPC7905HF or TA79005S
Q1,3,4	:DTC124EU
Q2	:2SC3246
Q5,6	:2SC4081(R,S)
Q7,9,11	:DTA124EU
Q8	:2SB1308(Q,R)
Q10	:2SD1963(R,S)
D1,2,9~14,28	:1SS355 or MA110
D3,4	:HN2D01F
D15	:DTZ8.2(B)
D16,23,24	:DTZ10(B)
D17~22,26	:5688B(TPB5) or 1SR139-100(T64)
D25,29~31	:DA204U
ED1	:FIP12CDM7

SIGNAL LINE
GND LINE
+B LINE
−B LINE

IC3 (Top View) DIGITAL SIGNAL PROCESSOR

IC6 (Bottom View) μ-COM

I/O EXPANDER

DISC MOTOR DRIVER

DOOR DRIVER

DATA

BUSY

TEST MODE

to GE-A5, A7 C-A9

CXA1372Q

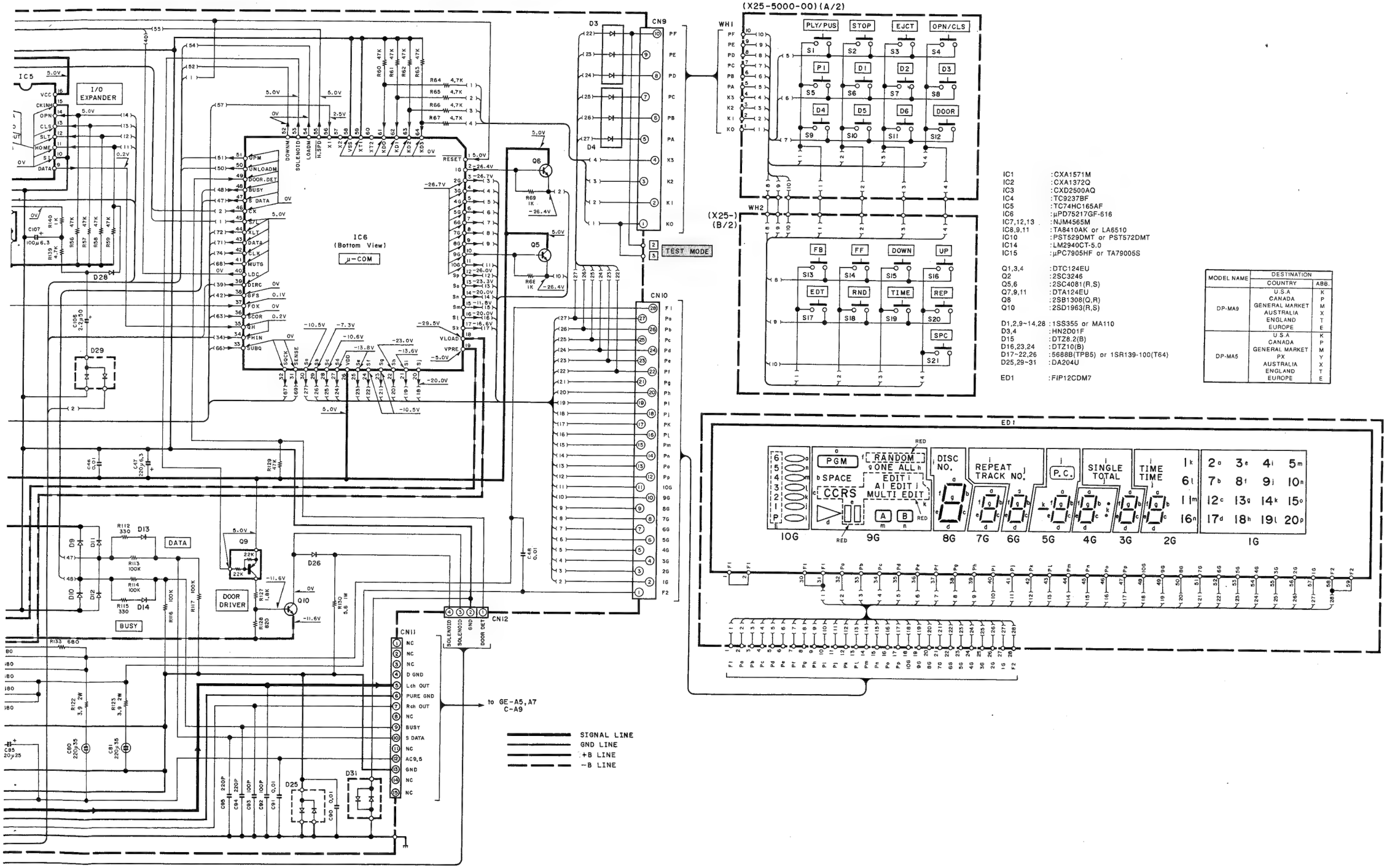
UPC7905HF

TA79005S

PST529DMT
PST572DMT

CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

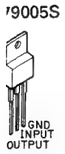
- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units



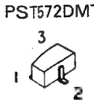
IC1	:CXA1571M
IC2	:CXA1372Q
IC3	:CXD2500AQ
IC4	:TC9237BF
IC5	:TC74HC165AF
IC6	:μPD75217GF-616
IC7,12,13	:NJM4565M
IC8,9,11	:TA8410AK or LA6510
IC10	:PST529DMT or PST572DMT
IC14	:LM2940CT-5.0
IC15	:μPC7905HF or TA79005S
Q1,3,4	:DTC124EU
Q2	:2SC3246
Q5,6	:2SC4081(R,S)
Q7,9,11	:DTA124EU
Q8	:2SB1308(Q,R)
Q10	:2SD1963(R,S)
D1,2,9~14,28	:1SS355 or MA110
D3,4	:HN2D01F
D15	:DTZ8.2(B)
D16,23,24	:DTZ10(B)
D17~22,26	:5688B(TPB5) or 1SR139-100(T64)
D25,29~31	:DA204U
ED1	:FIP12CDM7

MODEL NAME	DESTINATION	
	COUNTRY	ABB.
DP-MA9	U.S.A	K
	CANADA	P
	GENERAL MARKET	M
	AUSTRALIA	X
	ENGLAND	T
	EUROPE	E
DP-MA5	U.S.A	K
	CANADA	P
	GENERAL MARKET	M
	PX	Y
	AUSTRALIA	X
	ENGLAND	T
	EUROPE	E

9005S



PST529DMT
PST572DMT



CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units

DP- MA9/MA5 (J)/(K)

Y22-3080-11

DP-MA5/MA9

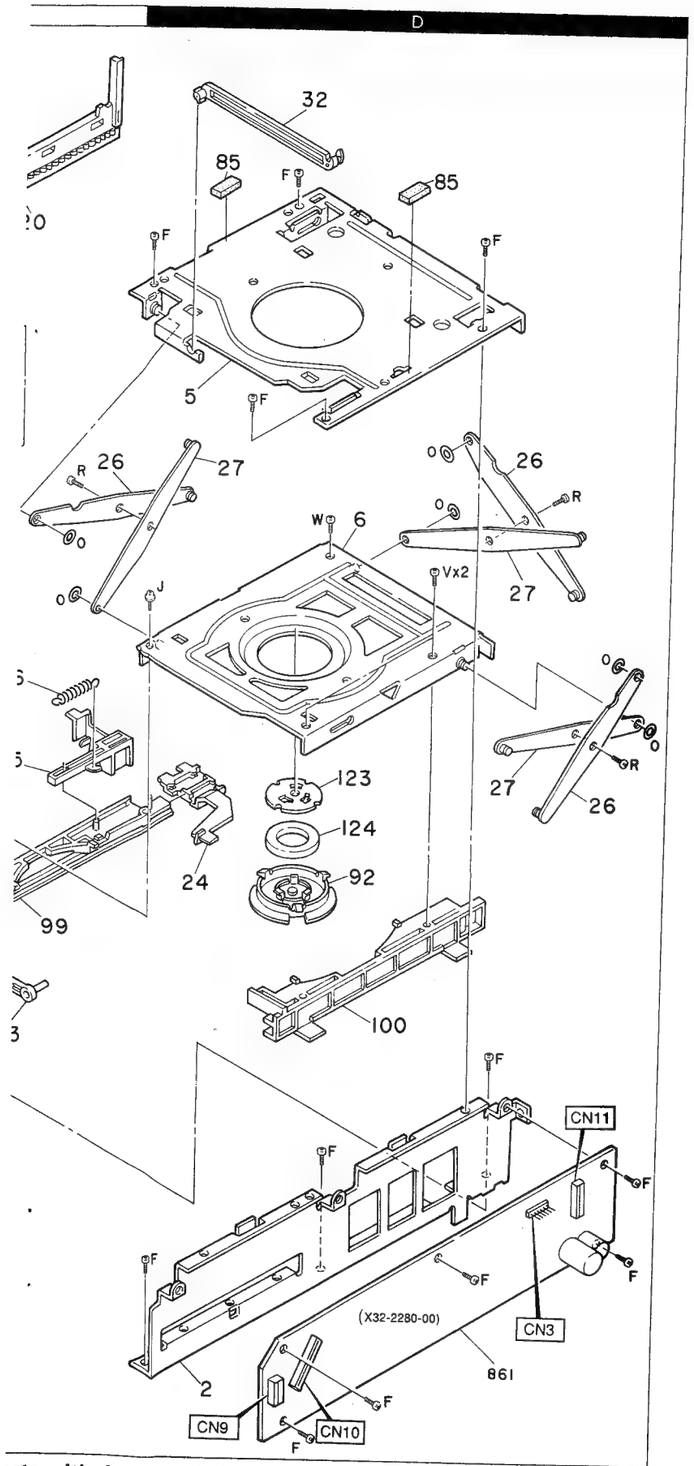
KENWOOD

DP-MA5/MA9 DP-MA5/MA9

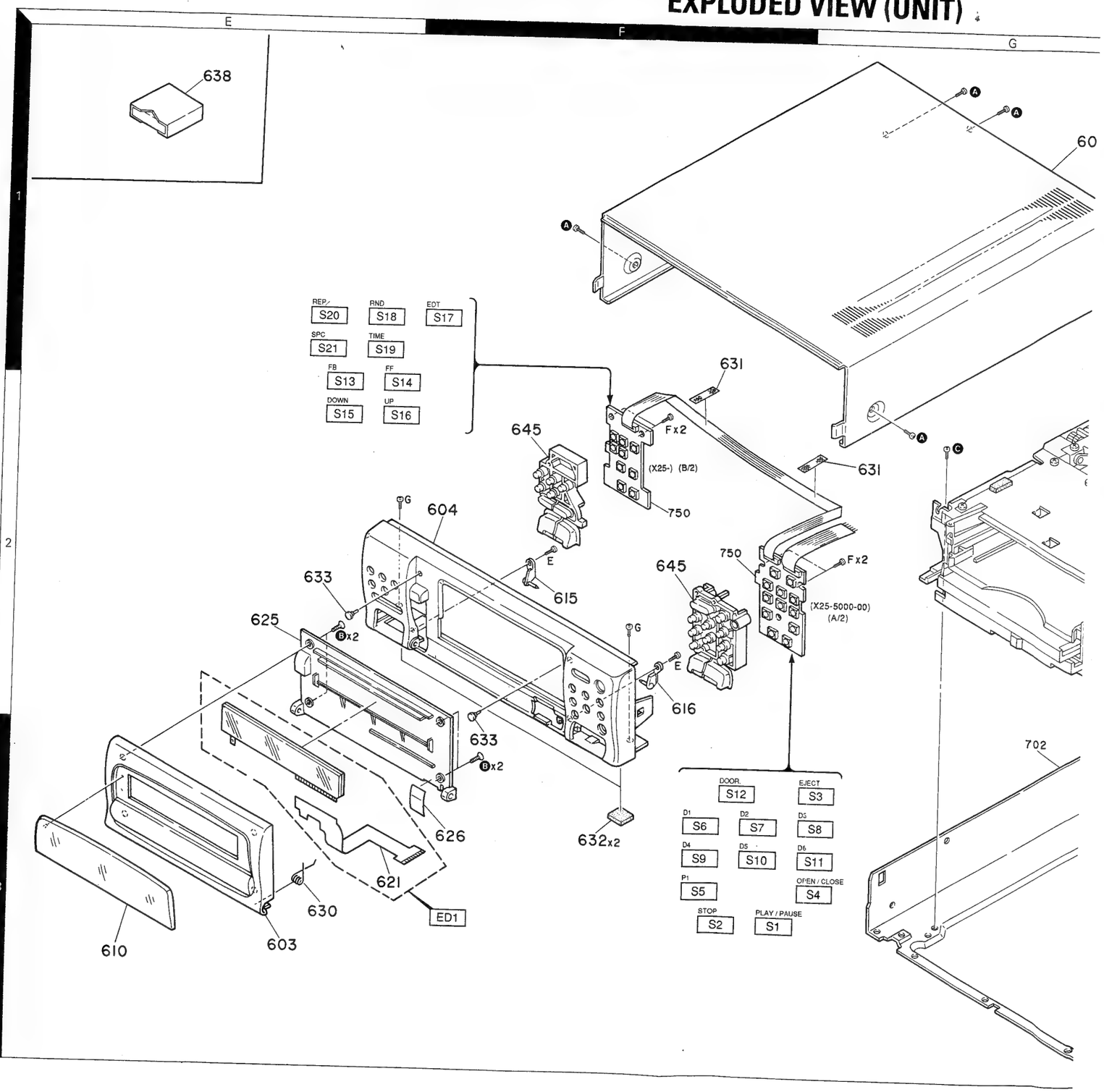
EXPLODED VIEW (MECHANISM)

Parts with the exploded numbers larger than 700 are not supplied.

EXPLODED VIEW (UNIT)



arts with the exploded numbers larger than 700 are not supplied.



EXPLODED VIEW (UNIT)

A		:N09-0310-05
B		:N09-2956-05
C		:N09-2957-05
D		:N09-2958-05
E	ø2.6x8	:N83-2608-46
F	ø2.6x8 (Bi-Tap)	:N89-2608-46
G	ø3x8 BLK	:N89-3008-45
H	ø3x10	:N89-3010-46
J		:N09-2769-05
K		:N09-2817-05
L		:N09-2913-05
M	ø2x3 (F)	:N09-2914-05
N		:N19-0366-04
O		:N19-0891-04
P		:N19-1105-04
Q		:N19-1318-04
R		:N38-2625-46
S		:N39-2025-46
T	ø2x8	:N83-2008-46
U	M2x8 (Bi)	:N86-2008-46
V	ø2x6 (Bi-Tap)	:N89-2006-46
W	ø2.6x6 (Bi-Tap)	:N89-2606-45
X	ø2.6x6 (Bi-Tap)	:N89-2606-46

Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
DP-MA5						
601	1G	*	A01-2970-01	METALLIC CABINET		
603	3E	*	A29-0319-12	PANEL		
604	2F	*	A60-0291-11	PANEL		
610	3E		B10-0972-04	FRONT GLASS		
-			B46-0122-23	WARRANTY CARD	E	
-			B46-0143-13	WARRANTY CARD	T	
-		*	B59-0179-04	CAUTION CARD		
615	2F	*	D19-0274-04	PIN		
616	2F	*	D19-0275-04	PIN		
620		*	E30-2713-05	CORD WITH CONNECTOR		
621	3E	*	E35-0385-04	FRAT CABLE		
625	2E	*	F07-0700-13	COVER		
626	3F	*	F19-1036-04	BLIND PLATE		
630	3E	*	G09-0625-14	SPRING		
631	1F,2G		G10-0173-04	NON-WOVEN FABRIC		
632	3F		G11-2052-14	CUSHION		
633	2E,3F		G13-0182-04	CUSHION		
-		*	H10-5360-12	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-5361-12	POLYSTYRENE FOAMED FIXTURE		
-			H20-0576-04	PROTECTION COVER	M	
-			H25-0681-04	PROTECTION BAG	KPYXTE	
-		*	H30-0077-04	ADHESIVE DOUBLE-COATED TAPE		
-		*	H50-0459-04	ITEM CARTON CASE	KPMYX	
637	3H		J02-0370-05	FOOT		
638	1E	*	J19-3394-13	HOLDER ASSY		
640	2H		J21-5947-04	WIRE BAND		
645	2F	*	K29-4457-12	KNOB		
ED1	3F	*	FIP12CDM7	INDICATOR TUBE		
DP-MA9						
601	1G	*	A01-2970-01	METALLIC CABINET		
603	3E	*	A29-0318-12	PANEL		
604	2F	*	A60-0290-11	PANEL		
610	3E	*	B10-1934-03	FRONT GLASS		
-			B46-0122-23	WARRANTY CARD	E	
-			B46-0143-13	WARRANTY CARD	T	
-		*	B59-0179-04	CAUTION CARD		
615	2F	*	D19-0274-04	PIN		
616	2F	*	D19-0275-04	PIN		
620	2H	*	E30-2713-05	CORD WITH CONNECTOR		
621	3E	*	E35-0435-08	WIRING HARNESS		
625	2E	*	F07-0700-13	COVER		
626	3F	*	F19-1036-04	BLIND PLATE		
630	3E	*	G09-0625-14	SPRING		
631	1F,2G		G10-0173-04	NON-WOVEN FABRIC		
632	3F		G11-2052-14	CUSHION		
633	2E,3F		G13-0182-04	CUSHION		

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

⚠ indicates safety critical components.

DP-MA5/MA9

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
-		*	H10-5360-12	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-5361-12	POLYSTYRENE FOAMED FIXTURE		
-			H20-0566-04	PROTECTION COVER	M	
-			H25-0397-04	PROTECTION BAG	KPXE	
-			H25-0659-04	PROTECTION BAG	T	
-		*	H30-0077-04	ADHESIVE DOUBLE-COATED TAPE		
-		*	H50-0425-04	ITEM CARTON CASE	KPMX	
-		*	H50-0458-04	ITEM CARTON CASE	TE	
-		*	H50-0460-04	ITEM CARTON CASE	TE	
637	3H		J02-0370-05	FOOT		
638	1E	*	J19-3394-13	HOLDER ASSY		
-			J61-0307-05	WIRE BAND		
645	2F	*	K29-4457-12	KNOB		
ED1	3F	*	FIP12CDM7	INDICATOR TUBE		
MECHANISM PCB (X25-5000-00)						
660	1B	*	E35-0389-05	WIRING HARNESS		
SW2	1B	*	S64-0006-05	LEVER SWITCH		
SW3 ,4	1B	*	S68-0025-05	PUSH SWITCH		
SW5	1B		S33-2062-05	LEVER SWITCH		
PH1	1B		T95-0123-05	OPTO ISOLATOR		
SWITCH (X25-5000-00)						
S1 -21			S40-1064-05	PUSH SWITCH		
CONTROL (X32-2280-00)						
C1			CE04KW1A470M	ELECTRO 47UF 10WV		
C2 ,3			CC73FSL1H150J	CHIP C 15PF J		
C4			CE04KW1V100M	ELECTRO 10UF 35WV		
C5			CE04KW1A470M	ELECTRO 47UF 10WV		
C6 ,7			CE04KW0J331M	ELECTRO 330UF 6.3WV		
C8			CC73FSL1H030C	CHIP C 3PF C		
C9			CC73FSL1H390J	CHIP C 39PF J		
C10			CK73EF1C684Z	CHIP C 0.68UF Z		
C11			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C12			CK73FB1H333K	CHIP C 0.033UF K		
C13			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C14			CK73FB1H223K	CHIP C 0.022UF K		
C15			CC73FSL1H121J	CHIP C 120PF J		
C16			CK73FB1H222K	CHIP C 2200PF K		
C17			CK73FB1H103K	CHIP C 0.010UF K		
C18			CK73FB1H102K	CHIP C 1000PF K		
C19			CK73FB1E104K	CHIP C 0.10UF K		
C20			CC73FSL1H470J	CHIP C 47PF J		
C21			CE04HW1H3R3M	NP-ELEC 3.3UF 50WV		
C22			CK73FB1E104K	CHIP C 0.10UF K		
C23			CC73FSL1H121J	CHIP C 120PF J		
C24			CK73FB1E104K	CHIP C 0.10UF K		
C25			CE04HW1E100M	NP-ELEC 10UF 25WV		
C26			CK73FB1E104K	CHIP C 0.10UF K		
C27			CC73FSL1H151J	CHIP C 150PF J		
C28 ,29			CK73FB1H103K	CHIP C 0.010UF K		
C30			CE04HW1E100M	NP-ELEC 10UF 25WV		
C31			CK73FB1H103K	CHIP C 0.010UF K		

L:Scandinavia K:USA P:Canada
Y:PX(Far East, Hawaii) T:England E:Europe
Y:AAFES(Europe) X:Australia M:Other Areas

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格			Destination 仕向	Remarks 備考
C32 ,33			CE04KW1C470M	ELECTRO	47UF	16WV		
C34			CE04HW1H010M	NP-ELEC	1.0UF	50WV		
C35			CC73FSL1H121J	CHIP C	120PF	J		
C36			CE04HW1H2R2M	NP-ELEC	2.2UF	50WV		
C37			CE04HW1H010M	NP-ELEC	1.0UF	50WV		
C38			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C39 -41			CE04HW1E100M	NP-ELEC	10UF	25WV		
C42 ,43			CK73FB1H103K	CHIP C	0.010UF	K		
C44			CE04HW1E100M	NP-ELEC	10UF	25WV		
C45 ,46			CK73FB1H103K	CHIP C	0.010UF	K		
C47			CE04KW0J221M	ELECTRO	220UF	6.3WV		
C48 ,49			CK73FB1H103K	CHIP C	0.010UF	K		
C50			CK73FB1H152K	CHIP C	1500PF	K		
C51			CK73FB1H473K	CHIP C	0.047UF	K		
C52			CE04HW1A220M	NP-ELEC	22UF	10WV		
C53			CK73FB1H332K	CHIP C	3300PF	K		
C54			CK73FB1H473K	CHIP C	0.047UF	K		
C55			CE04KW0J221M	ELECTRO	220UF	6.3WV		
C56			CE04KW0J471M	ELECTRO	470UF	6.3WV		
C57 ,58			CC73FCH1H470J	CHIP C	47PF	J		
C59 ,60			CC73FSL1H221J	CHIP C	220PF	J		
C61 -64			CK73FB1H471K	CHIP C	470PF	K		
C65			CK73FB1E104K	CHIP C	0.10UF	K		
C66 ,67			CK73FB1H103K	CHIP C	0.010UF	K		
C68 ,69			CK73FB1H681K	CHIP C	680PF	K		
C70			CK73FB1H103K	CHIP C	0.010UF	K		
C71 ,72			CE04HW1E100M	NP-ELEC	10UF	25WV		
C73 ,74			CK73FB1H102K	CHIP C	1000PF	K		
C75 ,76			CE04KW1A470M	ELECTRO	47UF	10WV		
C77			CK73FB1H103K	CHIP C	0.010UF	K		
C78			CE04KW1V470M	ELECTRO	47UF	35WV		
C79			CE04KW1V221M	ELECTRO	220UF	35WV		
C80 ,81		*	CE04HW1V221M	NP-ELEC	220UF	35WV		
C82 -85			CE04KW1E221M	ELECTRO	220UF	25WV		
C86			CE04KW1C472M	ELECTRO	4700UF	16WV		
C87			CE04KW1C222M	ELECTRO	2200UF	16WV		
C88			CK73FB1H103K	CHIP C	0.010UF	K		
C89			CE04KW1C222M	ELECTRO	2200UF	16WV		
C90 ,91			CK73FB1H103K	CHIP C	0.010UF	K		
C92 ,93			CC73FSL1H101J	CHIP C	100PF	J		
C94 ,95			CC73FSL1H221J	CHIP C	220PF	J		
C96 ,97			CE04KW1A101M	ELECTRO	100UF	10WV		
C98 -101			CE04KW1C470M	ELECTRO	47UF	16WV		
C102			CC73FSL1H680J	CHIP C	68PF	J		
C103,104			CK73FB1H473K	CHIP C	0.047UF	K		
C105			CE04KW1V4R7M	ELECTRO	4.7UF	35WV		
C106			C90-3254-05	ELECTRO	2.2UF	50WV		
C107			C90-3214-05	ELECTRO	100UF	6.3WV		
C108			CK73FB1H473K	CHIP C	0.047UF	K		
C109			CK73FB1H223K	CHIP C	0.022UF	K		
-			J11-0098-05	WIRE CLAMPER				
L1			L33-0369-05	CHOKE COIL				
X1			L77-1164-05	CRYSTAL RESONATOR				

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

⚠ indicates safety critical components.

DP-MA5/MA9

PARTS LIST

× New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
R82			RS14KB3A4R7J	FL-PROOF RS 4.7 J 1W		
R111			RS14KB3D101J	FL-PROOF RS 100 J 2W		
R122,123			RS14KB3D3R9J	FL-PROOF RS 3.9 J 2W		
R130			RS14KB3A5R6J	FL-PROOF RS 5.6 J 1W		
VR1 ,2			R12-3686-05	TRIMMING POT.(22K)		
VR3 ,4			R12-3685-05	TRIMMING POT.(10K)		
W1 -3			R92-0679-05	CHIP R 0 OHM		
W4			R92-0670-05	CHIP R 0 OHM		
W5 -13			R92-0679-05	CHIP R 0 OHM		
W14			R92-0670-05	CHIP R 0 OHM		
D1 ,2			MA110	DIODE		
D1 ,2			1SS355	DIODE		
D3 ,4		*	HN2D01F	DIODE		
D9 -14			MA110	DIODE		
D9 -14			1SS355	DIODE		
D15		*	DTZ8.2(B)	ZENER DIODE		
D16		*	DTZ10(B)	ZENER DIODE		
D17 -22		*	S5688B(TPB5)	DIODE		
D17 -22		*	1SR139-100(T64)	DIODE		
D23 ,24		*	DTZ10(B)	ZENER DIODE		
D25			DA204U	DIODE		
D26		*	S5688B(TPB5)	DIODE		
D26		*	1SR139-100(T64)	DIODE		
D28			MA110	DIODE		
D28			1SS355	DIODE		
D29 -31			DA204U	DIODE		
IC1		*	CXA1571M	IC(CD RF AMP)		
IC2			CXA1372Q	IC(CD RF SERVO)		
IC3			CXD2500AQ	IC(SIGNAL PROCESSOR)		
IC4			TC9237BF	IC(D/A CONVERTER)		
IC5		*	TC74HC165AF	IC(8BIT SHIFT REGISTER)		
IC6		*	UPD75217GF-616	IC		
IC7			NJM4565M	IC(OP AMP)		
IC8 ,9			LA6510	IC(DUAL POWER OP AMP)		
IC8 ,9			TA8410AK	IC(POWER OP AMP)		
IC10		*	PST529DMT	IC(SYSTEM RESET)		
IC10			PST572DMT	IC(SYSTEM RESET)		
IC11			LA6510	IC(DUAL POWER OP AMP)		
IC11			TA8410AK	IC(POWER OP AMP)		
IC12,13			NJM4565M	IC(OP AMP)		
IC14			LM2940CT-5.0	IC(LOW VOLTAGE REGULATOR)		
IC15			TA79005S	IC(VOLTAGE REGULATOR/ -5V)		
IC15			UPC7905HF	IC(VOLTAGE REGULATOR/ -5V)		
Q1			DTC124EU	DIGITAL TRANSISTOR		
Q2			2SC3246	TRANSISTOR		
Q3 ,4			DTC124EU	DIGITAL TRANSISTOR		
Q5 ,6			2SC4081(R,S)	TRANSISTOR		
Q7			DTA124EU	DIGITAL TRANSISTOR		
Q8			2SB1308(Q,R)	TRANSISTOR		
Q9			DTA124EU	DIGITAL TRANSISTOR		
Q10			2SD1963(R,S)	TRANSISTOR		
Q11			DTA124EU	DIGITAL TRANSISTOR		
MECHANISM (X92-1740-10)						
1	3C	*	A10-3025-01	CHASSIS ASSY		

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

⚠ indicates safety critical components.

PARTS LIST

× New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
2	3D	*	A11-0742-02	SUB CHASSIS		
3	1C	*	A11-0745-01	SUB CHASSIS		
4	1B	*	A11-0746-04	SUB CHASSIS CALKING ASSY		
5	1D	*	A11-0750-02	SUB CHASSIS		
6	2D	*	A11-0752-02	SUB CHASSIS		
7	1A	*	A11-0753-03	SUB CHASSIS		
8	3B	*	A11-0763-04	SUB CHASSIS CALKING ASSY		
9	1A	*	A11-0765-04	SUB CHASSIS CALKING ASSY		
14	3A		D10-3105-03	SLIDER		
15	2B	*	D10-3257-03	SLIDER		
16	1A	*	D10-3258-03	ARM		
17	2B	*	D10-3260-03	ARM		
18	1B	*	D10-3261-03	SLIDER		
19	1B	*	D10-3262-04	SLIDER		
20	1C	*	D10-3263-03	SLIDER		
21	1C	*	D10-3264-04	SLIDER		
22	1B	*	D10-3265-04	ARM		
23	1A	*	D10-3266-03	ARM		
24	2D	*	D10-3267-03	ARM		
25	2C	*	D10-3268-03	SLIDER		
26	1C,1D	*	D10-3269-04	ARM ASSY		
27	1D,2D	*	D10-3271-04	ARM ASSY		
32	1D	*	D10-3273-03	ARM		
33	3C	*	D10-3274-04	ARM		
34	2A	*	D10-3275-04	SLIDER		
35	2A	*	D10-3276-03	ARM		
36	1A	*	D10-3278-04	ARM ASSY		
37	3A	*	D10-3281-03	SLIDER		
38	1C	*	D10-3294-14	ROD		
43	3B	*	D13-0983-04	GEAR		
44	2B	*	D13-0984-04	GEAR		
45	2B	*	D13-0985-04	GEAR		
46	2B	*	D13-0986-04	GEAR		
47	2B,2C	*	D13-0987-04	GEAR		
48	2C	*	D13-0989-04	GEAR		
49	2C	*	D13-0990-04	GEAR		
50	2B	*	D13-0991-04	GEAR		
51	1B	*	D13-0992-04	GEAR		
52	1B	*	D13-0993-04	GEAR		
53	1B	*	D13-0994-04	GEAR		
54	2B	*	D13-0995-04	GEAR		
55	3B	*	D13-0996-04	GEAR		
56	3B	*	D13-1502-04	WORM		
57	3A		D21-1633-05	SHAFT		
60	3B	*	E35-0388-05	WIRING HARNESS		
61	3A	*	E35-0390-05	WIRING HARNESS		
62	2B,2C	*	E35-0391-05	WIRING HARNESS		
63	1B	*	E35-0392-05	WIRING HARNESS		
64	2C	*	E35-0417-05	WIRING HARNESS		
65	2C	*	E35-0418-05	WIRING HARNESS		
66	1A	*	E35-0435-08	WIRING HARNESS		
70	3A		G01-3333-04	EXTENSION SPRING		
71	1A	*	G01-3470-08	TORSION COIL SPRING		

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
72	1A	*	G01-3471-08	EXTENSION SPRING		
73	2B	*	G01-3472-04	EXTENSION SPRING		
74	2C	*	G01-3473-04	COMPRESSION SPRING		
75	1C	*	G01-3474-04	EXTENSION SPRING		
76	2C	*	G01-3475-04	EXTENSION SPRING		
77	2A	*	G01-3476-04	EXTENSION SPRING		
78	1A	*	G01-3477-04	EXTENSION SPRING		
79	1B	*	G01-3480-04	EXTENSION SPRING		
80	1A	*	G01-3481-08	EXTENSION SPRING		
81	2C	*	G01-3485-04	COMPRESSION SPRING		
82	2C	*	G01-3518-04	COMPRESSION SPRING		
83	2B	*	G02-1002-04	FLAT SPRING		
84	1B,3C		G10-0146-04	NON-WOVEN FABRIC		
85	1A,1D	*	G11-0129-04	SOFT TAPE (20X7X3)		
86	1A,1B	*	G11-2134-08	CUSHION		
91	2C		J02-1058-15	INSULATOR		
92	2D	*	J11-0181-03	CLAMPER		
93	3A	*	J19-3485-02	HOLDER ASSY		
94	3A	*	J19-3486-01	HOLDER		
95	2B	*	J19-3487-02	HOLDER		
96	2A	*	J19-3489-02	HOLDER		
97	1B	*	J21-5922-04	MOUNTING HARDWARE		
98	1C	*	J90-0685-03	GUIDE		
99	2C	*	J90-0686-04	RAIL ASSY		
100	3D	*	J90-0688-03	RAIL		
101	3A	*	J99-0517-02	TRAY		
⚠ 106	1A		S33-1002-05	LEVER SWITCH (POWER TYPE)		
107	3B		S33-2061-05	LEVER SWITCH		
SW1	2C		S33-1022-05	LEVER SWITCH		
122	2B		T42-0597-05	DC MOTOR		
123	2D		T50-1055-04	YOKE		
124	2D		T99-0503-15	MAGNET		
DM	2C	*	A11-0780-04	SUB CHASSIS ASSY		
FM	1B	*	T42-0612-04	MOTOR ASSY		
LM	3A	*	T42-0620-05	DC MOTOR		
PU	1C	*	T25-0023-05	OPTICAL PICKUP HEAD		
SOL1	1A	*	T94-0227-08	MAGNETIC PLUNGER		
VM	1B		T42-0567-05	DC MOTOR		

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

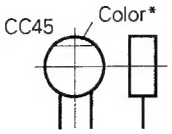
⚠ indicates safety critical components.

PARTS LIST

CAPACITORS

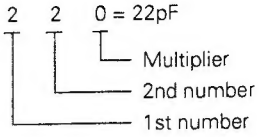
CC 45 TH 1H 220 J
1 2 3 4 5 6

1 = Type ... ceramic, electrolytic, etc.
2 = Shape ... round, square, ect.
3 = Temp. coefficient
4 = Voltage rating
5 = Value
6 = Tolerance



• Capacitor value

010 = 1pF
100 = 10pF
101 = 100pF
102 = 1000pF = 0.001μF
103 = 0.01μF



• Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = -470 ± 60ppm/°C

• Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10μF - 10 ~ +50 Less than 4.7μF -10 ~ +75

(Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

• Voltage rating

1st word \ 2nd word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	-

• Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)

(EX) C K 7 3 F F 1 H 0 0 0 Z
1 2 3 4 5 6 7
(Chip) (B, F)

Refer to the table above.
1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance

Dimension (Chip capacitors)

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
A	4.5 ± 0.5	3.2 ± 0.4	Less than 2.0
B	4.5 ± 0.5	2.0 ± 0.3	Less than 2.0
C	4.5 ± 0.5	1.25 ± 0.2	Less than 1.25
D	3.2 ± 0.4	2.5 ± 0.3	Less than 1.5
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25
G	1.6 ± 0.2	0.8 ± 0.2	Less than 1.0

RESISTORS

• Chip resistor (Carbon)

(EX) R K 7 3 E B 2 B 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B,F)

Dimension (Chip resistor)

Dimension code	L	W	T
E	3.2 ± 0.2	1.6 ± 0.2	1.0
F	2.0 ± 0.3	1.25 ± 0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1

• Carbon resistor (Normal type)

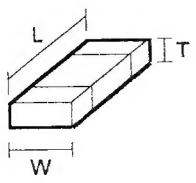
(EX) R D 1 4 B B 2 C 0 0 0 J
1 2 3 4 5 6 7

1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Rating wattage
6 = Value
7 = Tolerance

Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

Dimension



DP-MA5/MA9

SPECIFICATIONS

Laser	**Semiconductor laser**
Playing rotation	**200rpm~500rpm (CLV)**
Frequency response	**20Hz~20kHz, ±1.0dB**
Signal to noise ratio	**More than 93dB**
Total harmonic distortion	**Less than 0.01% (at 1kHz)**
Channel separation	**More than 85dB (at 1kHz)**
Wow & Flutter	**Unmeasurable Limit**

[GENERAL]

Dimensions (W x H x D)	**270 (10-5/8") x 85 (3-3/8") x 310 (12-3/16")mm**
Weight (Net)	**3.2kg (7.0lb)**

KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Note :
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S.A. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

KENWOOD CORPORATION
Alive Mitake, 2-5, 1-chome Shibuya, Shibuya-ku, Tokyo 150, Japan
KENWOOD U.S.A. CORPORATION
CONSUMER ELECTRONICS GROUP
P.O. BOX 22745, 2201 East Dominguez St., Long Beach, CA 90810, U.S.A.
KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8
KENWOOD ELECTRONICS LATIN AMERICA S.A.
P.O. BOX 55-2791, Piso 6 Plaza Chase, Cl. 47 y Aquilino de la Guardia, Panama, Republic de Panama
TRIO-KENWOOD U.K. LIMITED
KENWOOD House, Dwight Road, Watford, Herts., WD1 8EB United Kingdom
KENWOOD ELECTRONICS BENELUX N.V.
Mechelsesteenweg 418 B-1930 Zaventem, Belgium
KENWOOD ELECTRONICS DEUTSCHLAND GMBH
Rembrücker-Str. 15, 6056 Heusenstamm, Germany
TRIO-KENWOOD FRANCE S.A.
13 Boulevard Ney, 75018 Paris, France
KENWOOD LINEAR S.p.A.
20125, Milano-via Arbe, 50, Italy
KENWOOD ESPAÑA S.A.
Bolivia, 239-08020 Barcelona, Spain
KENWOOD ELECTRONICS AUSTRALIA PTY. LTD. (A.C.N. 001 499 074)
P.O. BOX 504, 8 Figtreel Drive, Australia Centre, Homebush, N.S.W. 2140, Australia
KENWOOD & LEE ELECTRONICS, LTD.
Unit 3712-3724, Level 37 Tower 1, Metroplaza, 223 Hing Fong Road, Kwai Fong N.T. Hong Kong
KENWOOD ELECTRONICS SINGAPORE PTE LTD.
No. 1 Genting Lane #07-00, Singapore, 1334